

MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE  
Roland D. Martin, Commissioner

# Wildlife Division

## Research & Management Report 2008



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## “STEWARDS OF MAINE’S WILDLIFE RESOURCES”

The dedicated, professional biologists of the Wildlife Division, Maine Department of Inland Fisheries and Wildlife (MDIFW), are the “**stewards of Maine’s wildlife resources.**” Without wildlife, which we all love and enjoy, Maine would not be the same – and the biologists of the Maine Department of Inland Fisheries and Wildlife protect and manage your wildlife. Many of us choose to live in Maine for the opportunity to share our world with wildlife, whether we feed the birds in our back yard, hunt deer in the north woods, appreciate the beauty of butterflies, kayak the coast to observe seabirds, or just enjoy seeing a big bull moose in a bog.

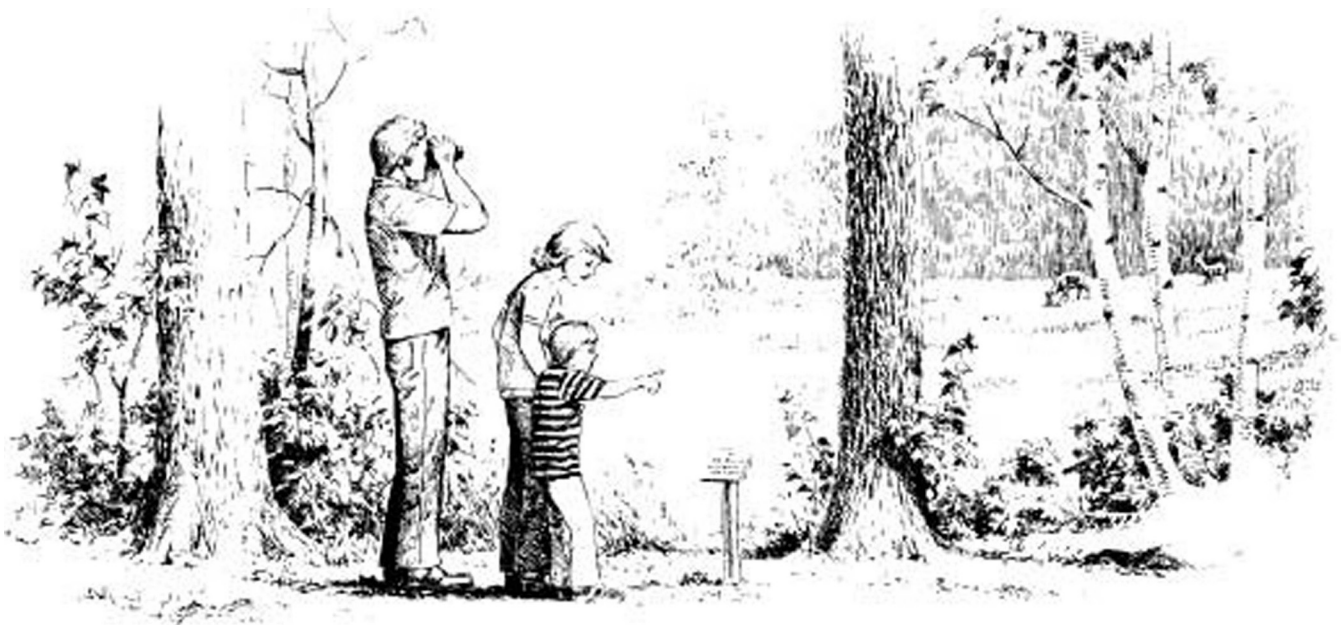
To be healthy and thrive, all animals need a place to live where they can find food, water, and shelter – biologists refer to this “place” as habitat. When habitat is lost or degraded, we lose the diversity of wildlife we currently enjoy. Conserving and managing wildlife habitat is a major responsibility of Maine’s wildlife biologists. High quality habitat – an assortment of environments in which plants and animals live, like a patchwork quilt of differing habitats – preserves abundant and diverse wildlife populations. These habitats provide many other benefits to the public, including strong economic benefits to Maine communities. The economic impact of wildlife recreation in Maine was estimated to be over 1.1 billion dollars in 1996, surpassing Maine’s other recreation industries.

**The efforts of the biologists of the Maine Department of Inland Fisheries and Wildlife to protect wildlife and habitat – funded by your purchase of loon license plates, contributions to the chickadee tax check-off, purchase of Maine Outdoor lottery tickets, and the purchase of hunting and trapping licenses – are critical to protecting your way of life and preserving Maine’s economic foundation based on its unique natural resources.**

The members of the Wildlife Division thank you for your interest, support, and participation in the conservation of your wildlife. We look forward to working with you to meet the challenges of the coming years.

Here’s to informative, and I trust, enjoyable reading!

--G. Mark Stadler  
*Director, Wildlife Division*



**These studies are financed in part through Federal Aid in Wildlife Restoration Funds under Projects 81D, 82R, and 83C, and through the Endangered Species Conservation Act.**

The Department of Inland Fisheries and Wildlife receives Federal funds from the U.S. Department of the Interior. Accordingly, all Department programs and activities must be operated free from discrimination in regard to race, color, national origin, age or handicap. Any person who believes that he or she has been discriminated against should write to The Office of Equal Opportunity, U.S. Department of the Interior, Washington, D.C.





# FUNDING WILDLIFE AND HABITAT STEWARDSHIP

Funding for wildlife management comes from many different sources. Most of our work with game animals and furbearers, many of the salaries, and most of the administrative costs of the Wildlife Division, are funded by hunting license revenues, which are matched by federal Pittman-Robertson Funds (based on an 11% excise tax on sporting arms, ammunition, and archery equipment, and a 10% excise tax on handguns).

Funding for other species comes from a variety of sources. In addition to State Wildlife Grants, a recent Federal program based on Maine's Wildlife Action Plan [http://www.maine.gov/ifw/wildlife/groups\\_programs/comprehensive\\_strategy/index.htm](http://www.maine.gov/ifw/wildlife/groups_programs/comprehensive_strategy/index.htm), a large portion of the funds also comes from the sale of hunting licenses and permits. Other sources of money include "Section 6" funds from the US Fish and Wildlife Service for the recovery of threatened and endangered species, the Oil Spill Conveyance Fund, contributions to the **Nongame and Endangered Wildlife Fund** ("Chickadee Check-off"), and purchases of **Conservation License (Loon) Plates**. Some of these funds are used as match to obtain federal funds.

Some people are unaware of the contribution hunters and trappers make toward the conservation of rare, threatened, and endangered wildlife. Also, you may be surprised to know that many of the financial supporters of the endangered species program are also sportsmen who are committed to the conservation of all Maine's wildlife. **Wildlife belongs to all of the people of the state**, and sportsmen's dollars can't be expected to do it all.

**Stable funding to address wildlife programs is desperately needed.** Contributions to the Chickadee Check-off, Conservation Registration plates (Loon Plates), and the Maine Outdoor Heritage Fund provide the core funding for Maine's nongame and endangered species programs; however, the many conservation needs exceed the funds contributed...and contributions are declining (Table 1). All money donated, whether through the Chickadee Check-off, Conservation License (Loon) Plates, grants, or direct gifts, are deposited into the Maine Endangered and Nongame Wildlife Fund - a special, interest-bearing account from which money can only be spent for the conservation of Maine's nongame wildlife, includes rare, threatened or endangered species.

Given our limited financial resources, Maine can be proud of the accomplishments made for nongame and endangered wildlife in the last 20 years. We thank those of you who buy a Loon Plate, participate in the Chickadee Check-off, or purchase a Maine Outdoor Heritage Fund lottery ticket. Your voluntary support and generosity deserves a special "thank you." **We are all working hard to keep Maine a special place.** Take pride in your accomplishments - and please, as you fill out your tax return next year or register your car, join with us again in conserving Maine's wildlife diversity!

**Table 1. A history of income derived from the "Chickadee Check-off," Loon Plate, and Maine Outdoor Heritage Fund to benefit nongame and endangered wildlife programs.**

Year	Chickadee Check-off				Loon License Plate		Maine Outdoor Heritage Fund	
	Total Given	Number of Givers	Average Donation	Percent of Taxpayers Giving	Income to MDIFW	Number of Registrations	Income to MDIFW	Number of Projects Funded
1984	\$115,794	25,322	\$4.57	5.3%				
1985	\$129,122	29,200	\$4.42	6.0%				
1986	\$112,319	26,904	\$4.17	5.4%				
1987	\$114,353	26,554	\$4.31	5.2%				
1988	\$103,682	24,972	\$4.15	4.8%				
1989	\$93,803	20,322	\$4.62	3.6%				
1990	\$88,078	18,332	\$4.80	3.2%				
1991	\$92,632	19,247	\$4.81	3.4%				
1992	\$95,533	18,423	\$5.18	3.2%				
1993	\$82,842	15,943	\$5.20	2.8%				
1994	\$84,676	10,863	\$7.79	2.0%	\$335,042	59,829		
1995	\$81,775	10,014	\$8.17	1.8%	\$457,307	81,662		
1996	\$90,939	11,024	\$8.25	2.0%	\$535,679	95,657	\$112,232	3
1997	\$77,511	8,686	\$8.92	1.5%	\$588,364	105,065	\$133,971	5
1998	\$48,189	4,065	\$11.85	0.7%	\$617,484	110,265	\$184,109	7
1999	\$47,908	3,775	\$12.69	0.7%	\$569,610	101,716	\$121,436	5
2000	\$44,496	3,297	\$13.50	0.6%	\$499,486	89,194	\$323,884	11
2001	\$49,348	3,713	\$13.29	0.6%	\$458,057	81,796	\$148,408	5
2002	\$50,412	3,661	\$13.77	0.6%	\$446,342	79,704	\$172,191	8
2003	\$55,348	3,792	\$14.60	0.6%	\$425,147	75,919	\$184,129	5
2004	\$43,158	3,234	\$13.35	0.6%	\$402,695	69,615	\$234,126	10
2005	\$36,769	2,931	\$12.54	0.5%	\$381,948	67,814	\$154,656	7
2006	\$36,865	2,924	\$12.60	0.5%	\$367,791	65,677	\$116,121	6
2007	\$37,209	2,852	\$13.04	0.5%	\$355,180	63,425	\$141,526	6

**Our most pressing need is a stable and adequate source of funding for all of our programs.** The Association of Fish & Wildlife Agencies evaluating the Department and the Wildlife Division recognized this need in a report. In 2001, the Citizens' Advisory Committee identified several possible sources of funding – here are a few of those ideas to consider:

- That the Constitution of Maine be amended to require that at least 1/8 of one percent of the State Sales Tax be dedicated to fish and wildlife conservation programs to be distributed to the various state agencies that administer those programs.
- That the share of state gas tax revenues distributed to state agencies for operation of boating, ATV and snowmobile and related programs should be at least equal to the portion of the gas tax revenues generated by watercraft and recreational vehicle gas sales.
- That every 4 years hunting and fishing license fees should be reviewed by the Legislature and adjusted as appropriate to reflect the cost of providing hunting and fishing-related services.
- That the Maine Income Tax return be revised to restore the Chickadee Check-off to the main part of the tax form.

What do you think about these ideas? Your support to establish a stable funding source to continue the work of the Wildlife Division is appreciated.

## There's something wild lurking on your tax return!



Give a gift to  
wildlife this year -  
put a check with  
the chickadee!



*Next time you are in your local super market  
or convenience store, please buy an*  
**OUTDOOR HERITAGE FUND LOTTERY TICKET!!**



# IMPLEMENTING SUCCESSFUL HABITAT PROTECTION & MANAGEMENT

Maine's diverse assemblage of wildlife, plants, and natural communities is threatened. Over two-thirds of the state's rare and endangered species are endangered because of habitat loss. Three collaborative programs administered by the Maine Department of Inland Fisheries and Wildlife in cooperation with conservation partners are working to stem the tide of habitat loss and conserve at-risk species and their habitats.

## COLLABORATION WITH PARTNERS

### ***Maine's Wildlife Action Plan: From Vision to On-the-Ground Action***

Maine's Wildlife Action Plan (WAP) was developed in 2005 as a requirement of the State Wildlife Grant Program (SWG) created by Congress in 2002 to address conservation of fish and wildlife species of greatest conservation need. Maine's WAP is a collective vision for the future of our state's wildlife. The Plan assesses the condition of Maine's wildlife and habitats and examines the full range of challenges and actions vital to keeping wildlife from becoming endangered.

Across the state, MDIFW and its partners are turning the ambitious conservation vision outlined in our state Wildlife Action Plan into on-the-ground action. Two examples are provided below. A third example – Beginning with Habitat – is discussed in the next section.

### ***Gathering Information to Take Action - Conserving the Endangered Black Racer***

The northern black racer is a state endangered and a Species of Greatest Conservation Need in Maine's Wildlife Action Plan. Large but rarely encountered snakes, black racers require large blocks of pine-oak forests, sand-plain pine-barrens, heath-lands, or reverting farmland. In Maine, racers are limited to the southern third of the state and could be lost entirely due to their low numbers and habitat loss and fragmentation. In an effort to better understand racer habitat use, home range size, and denning ecology, the Maine Department of Inland Fisheries and Wildlife is conducting a radio telemetry study for this species. This research and future efforts will provide a significant contribution to racer conservation in the northeastern United States.

### ***Working with Partners to Bring Back Wildlife and Natural Areas - Restoring Seabirds to Eastern Brothers Island***

With assistance from the Maine Department of Inland Fisheries and Wildlife, Maine Coastal Islands National Wildlife Refuge initiated a seabird restoration project in 2007 on Eastern Brothers Island, a 17 acre island owned by the U.S. Fish and Wildlife Service in Jonesport. The site was selected for its remote 80 foot cliffs, the strategic location between two active puffin and razorbill colonies (Petit Manan and Machias Seal Islands), and current value to breeding black guillemots, common eiders, and leach's storm petrels. Efforts included setting up 128 tern, Atlantic puffin, and razorbill decoys to attract birds, conducting a prescribed burn, and setting up a sound system to continuously play tern colony sounds. Increasing the number and geographic distribution of tern and alcid (puffin and razorbill) colonies along the Maine coast is an objective identified in Maine's Wildlife Action Plan. Regular sightings of razorbills and a breeding pair of common terns in 2007 indicate Eastern Brothers Island will soon become a productive colony, conserving these birds before they become more rare and costly to protect.

To view a copy of Maine's WAP, go to [http://www.maine.gov/ifw/wildlife/groups\\_programs/comprehensive\\_strategy/index.htm](http://www.maine.gov/ifw/wildlife/groups_programs/comprehensive_strategy/index.htm).

--Sandy Ritchie  
*Habitat Conservation and Special Projects*

## BEGINNING WITH HABITAT

The vast majority of land use and development decisions in Maine are made at the local level. Under Maine's tradition of municipal home rule, towns are responsible for shaping their own future by directing growth through local planning boards and attracting businesses through local economic development corporations. Few towns, however, have the capacity or expertise to know how their decisions today will affect the plant and animal resources available to future generations 50 years from now. Beginning with Habitat, a cooperative effort of agencies and organizations was created to fill this niche and is the foundation upon which Maine's Wildlife Action Plan was built. Beginning with Habitat not only provides organized towns throughout the state with comprehensive fish, wildlife, plant, and natural community information tailored to the specific town, but provides local boards, committees, and planning staff with technical assistance in crafting tools to address local habitat needs and concerns. The intent of this program is not to stop growth so vital to Maine's economy,

but to do growth better and in a way that helps to conserve our natural heritage while at the same time conserving our irreplaceable Maine character.

To date, the Beginning with Habitat program has worked with over 200 municipalities to help identify local habitat conservation and open space priorities and to provide guidance in implementing local strategies for protection of key local resources. Increasingly, towns are turning to Beginning with Habitat to better understand options for local implementation of conservation strategies. Most town comprehensive plans now utilize Beginning with Habitat as the starting point for developing local conservation priorities and to strategically evaluate local land use opportunities. Other towns are turning to Beginning with Habitat to assist with developing more effective habitat provisions in local land use subdivision ordinances.

This year, the Beginning with Habitat program introduced new map formats that are easier to interpret and provide more in depth explanations of the data and how best to use it. The new map formats include a regional perspective map that includes data from surrounding towns and better emphasizes the importance of regional cooperation when it comes to conserving resources shared by multiple towns. Additionally, impervious surfaces as identified in the Maine land cover data has been added to each map to better depict existing development patterns and provide better reference for map users.

The Beginning with Habitat Steering Committee has recently wrapped up efforts to identify Focus Areas of Statewide Ecological Significance in all of Maine's organized and unorganized towns. This effort included a review of existing coastal resource data to better reflect Maine's marine diversity and inseparability of coastal terrestrial systems from the influence of tidal and sub-tidal ecosystems. Beginning with Habitat focus areas are intended to reflect state conservation priorities as identified by Beginning with Habitat partner groups, but also are intended to build awareness and appreciation of Maine's special places at the local level.

Currently, Beginning with Habitat is in the process of identifying resources necessary to digitize and incorporate freshwater fisheries data into map products and Focus Area representations. To date, with the help of Beginning with Habitat Steering Committee partners at Maine Department of Transportation, all existing eastern brook trout data from on-going stream survey efforts has been digitized. Priority trout habitat will soon be incorporated into map products provided to municipal partners.

Beginning with Habitat added an online toolbox to our existing website in January of 2008. The intent of this tool is to provide municipal committee members, planners, and land trust members with immediate access to local strategies that can be employed to better incorporate habitat conservation into local comprehensive planning, open space planning and local land use ordinances. The toolbox offers actual language developed by municipalities throughout the state with accompanying explanatory notes detailing why certain approaches were developed and how they are intended to work. The toolbox also includes contact information for a variety of state, federal, and private grant funding sources.

Beginning with Habitat has recently hired a GIS firm and web-services designer to build an online map service and integrated biodiversity encyclopedia. Once complete in the fall of 2008, anybody with web access will be able to navigate seamless Beginning with Habitat data for any of Maine's organized towns. The user will also be able to link directly to species and habitat information by clicking on map features. This service will better enable us to provide immediate access to up to date data and break our current reliance on hard copy maps and fixed format .pdf versions of maps. We are hopeful that this degree of on-line access to Beginning with Habitat information will better equip local planners, developers, and outdoor enthusiasts alike with the knowledge necessary to make the informed choices necessary to better protect the qualities of Maine that we all cherish. <http://www.beginningwithhabitat.org>

--Steve Walker  
*Beginning with Habitat Program Coordinator*

## LANDOWNER INCENTIVE PROGRAM

Private landowners are integral to the conservation of our wildlife heritage and natural resources and are often committed in principle to stewardship of endangered or threatened species, but the lack of financial and technical incentives has limited the scale of long-term conservation.

In 2004, the Landowner Incentive Program (LIP) was established as a competitive grant program to support collaborative efforts to partner with private landowners to cultivate and fund conservation opportunities for critical habitats in the state. Since its inception, Maine has received more than \$3 million for long-term habitat protection of rare and endangered species. Currently, LIP funds are being used in three areas:



1. **Bald Eagle Nesting Habitat Protection** - Maine is one of the primary strongholds of bald eagles along the Atlantic coast; the state's population accounts for more than 75% of eagle numbers resident in the northeastern U.S. Although statewide numbers are now at recovery levels established for Maine in 1989, bald eagles remain a rarity in all but a few localities. LIP funds are being used to enhance stewardship of privately owned lands strategic to conservation efforts for bald eagle nesting habitat by developing management agreements for at least 30 nesting areas (more than 4,500 acres) across Maine.
2. **Piping Plover and Least Tern Nesting Habitat Protection** - approximately 75% of piping plovers nesting in Maine nest on a relatively few privately-owned beaches in the state. Many of these beaches are highly developed, and management of these endangered birds requires careful negotiations with landowners. The Maine Department of Inland Fisheries and Wildlife and Maine Audubon are using LIP funds to better manage piping plover and least tern habitat on privately owned land.
3. **Species-at-Risk Focus Areas in Southern and Coastal Maine** - Southern and coastal Maine have the highest level of plant and wildlife species diversity in the state including the highest numbers of populations of rare plant and animal species. Unfortunately, this area is one of the most desirable for development, and increasing development is leading to habitat fragmentation and loss. Within this area, the State of Maine has been working hard to identify at risk plant and animal populations and the habitats they need to remain viable. The result of this effort is a mapped suite of species-at-risk focus areas. These areas include assemblages of the best examples of rare species populations and high quality natural habitats in Maine. Landowner Incentive Program funds are being used to acquire easements to preserve viable populations of rare plant and animal populations within species-at-risk focus areas. To date, nearly \$1.5 million has been awarded to land trusts for the purchase of conservation easements to protect more than 2,500 acres of critical habitat for rare, threatened and endangered species in southern, western, central, and mid-coast Maine. An additional \$800,000 will be awarded later in 2008.

Just as Maine is hitting its stride and beginning to show returns in on-the-ground work, Congress eliminated the LIP program from the FY 2008 Budget. A few Washington insiders are optimistic that LIP can be restored, but only time will tell if LIP funds will continue bolstering efforts to recover at-risk species populations which rely on private lands. To learn more about Maine's Landowner Incentive Program go to <http://www.mainenaturalareas.org/docs/lip/>.

--Sandy Ritchie  
*Habitat Conservation and Special Projects*





## WILDLIFE HABITAT GROUP

The Wildlife Habitat Group is responsible for creating, maintaining, and distributing a variety of information on locations of wildlife and their habitats. This information is used both within MDIFW and by other agencies and organizations for conducting environmental reviews, research, and landscaping planning. Although our Group is located within the Wildlife Resource Assessment Section in Bangor, we work with staff throughout the agency. The Habitat Group consists of:

**Donald Katnik, Habitat Group Leader, GIS Specialist, and Wildlife Biologist** - Supervises Group activities and coordinates habitat-related projects with other Division and Department staff and other State and Federal agencies.

**MaryEllen Wickett, Wildlife Biologist and Programmer/Analyst** - Develops computer applications to facilitate access to habitat data by IF&W staff and other users. Provides technical support and habitat data analyses for landscape planning efforts (including *Beginning with Habitat*) and development of species habitat models.

**Amy Meehan, Wildlife Biologist and GIS Specialist** - Collects wildlife habitat data from Regional Wildlife Biologists and others. Creates and maintains computer databases. Conducts field inventories of wildlife habitat and provides GIS support for a variety of projects.

**Jordan Bailey, Oil Spill Biologist** - Coordinates oil spill response planning efforts for the Division, including sensitive area identification and wildlife rehabilitation plan design and implementation.

**Tara King, Wildlife Biologist and GIS Specialist** - Develops, maintains, and analyzes databases of wildlife observations and habitat. Provides assistance to other Division biologists to assess species habitats on a statewide basis.

**Jason Czapiga, Cartographer** - Supports *Beginning with Habitat* program by generating maps, creating and maintaining GIS data, and assembling packages of habitat information.

## HABITAT MAPPING AND ANALYSES

### ***Wetlands, NRPA, and Shoreland Zoning***

The Habitat Group has been working with the Maine Department of Environmental Protection to update wetland maps for shoreland zoning and natural resource protection. MDIFW maintains a GIS database of "Inland Waterfowl and Wading Bird Habitats" (IWWH). A high- to moderate-value IWWH is a wetland complex and the 250-foot upland zone surrounding it. Wetland ratings are based on a combination of wetland type, habitat diversity, acreage, habitat interspersion, and percent open water. These habitats are protected under Maine's Natural Resources Protection Act (for more information about NRPA, visit [www.maine.gov/dep/blwq/docstand/nrpapage.htm](http://www.maine.gov/dep/blwq/docstand/nrpapage.htm)). High and Moderate value IWWHs with at least 10 acres of vegetated, non-forested wetlands also qualify for resource protection under Shoreland Zoning (for more information about shoreland zoning, visit [www.maine.gov/dep/blwq/docstand/szpage.htm](http://www.maine.gov/dep/blwq/docstand/szpage.htm)).

The existing IWWH GIS data is over 10 years old and was mapped partly from National Wetlands Inventory (NWI) data. Because resource protection and shoreland zoning have important implications for landowners, MDIFW and the Maine DEP have committed to updating the entire IWWH database for all organized towns in Maine. Habitat Group staff are using GIS and newer color, high-resolution aerial imagery from both spring and fall seasons to remap the boundary of each IWWH area and recalculate its NRPA rating. Considering the number of wetlands in Maine, this is a daunting task, but—when complete—the revised IWWH database will provide much more realistic maps for protecting some of Maine's most important wildlife habitats. Updates to these maps will also occur based on field visits.

### ***Development Mapping Update***

Forestry and agriculture can affect wildlife habitat by changing the suitability of the landscape for different species. These habitat changes are temporary. Under different management practices, the landscape can change into other habitats that benefit different wildlife species. In contrast, development—residential and commercial structures and the paved areas associated with them—alter the landscape permanently. Development also can create indirect loss of habitat by fragmenting the landscape.

The Beginning with Habitat program (<http://www.beginningwithhabitat.org>) received a \$250,000 grant from EPA in May 2007 to map development in organized towns. The project will create two snapshots of development in the organized towns of Maine; a "before" picture for 2004 and a "current" picture for 2007. These two "snapshot" maps will be incorporated into the Beginning with Habitat information package to allow municipal planners and land trusts to see

changes in development patterns across the landscapes they manage, providing another tool to guide smart growth. They also will assist MDIFW biologists with assessing changes in wildlife habitat. For more information about the EPA grant, visit <http://es.epa.gov/ncer/cns> (select "Project Descriptions" and look for Maine Department of Inland Fisheries and Wildlife).

The development maps will be created using color aerial imagery from the two time periods. Buildings and roads are easily identifiable in these high resolution images, but mapping them by hand would be take years. Instead, a computer program will classify each pixel as developed or not based on the characteristics of the light reflect by the land cover in it. We will use the EPA grant funds to hire this detailed work out to a contractor specializing in aerial imagery analysis. The Habitat Group's responsibility on this project includes developing the Request For Proposals (RFP) to solicit bids from contractors, overseeing the contract once a vendor is selected, and assisting with validating the image classifications.



### ***Wildlife Habitat Connectivity***

*Beginning with Habitat* is a collaborative, public-private partnership whose goal is to maintain habitat supporting healthy populations of Maine's native plants and wildlife (see the *Beginning with Habitat* Section on page 6). The program wanted to develop a new map to identify core habitat areas (patches) and potential landscape connections among them to help planners prioritize areas essential to conserving the ecological integrity of the ecosystem. Most attempts to map connectivity either generalize broad landscape patterns to the extent that the ecological meaning becomes questionable or they focus on species-specific needs that are difficult to apply beyond a local scale. Our objective was to integrate these approaches to create a multiple scale, hierarchical model of habitat connectivity. We are using statewide data for general landcover, hydrology, mapped wildlife habitats, natural areas, and transportation to develop a preliminary connectivity index combining landscape permeability and habitat edge effects. At the same time, we are developing species-specific connectivity models using survey and radio telemetry data for New England cottontail; black racers; Blanding's, spotted, and wood turtles; bobcat; and forest interior birds (see the Mammal Group, Bird Group, and Herpetile/ Invert Group sections in this report). Habitat Group played a key role in developing the landscape connectivity model and presented the methods and preliminary results from a pilot area at the Northeast Arc User's Conference in Burlington, VT last November. Unfortunately, other priorities have greatly reduced the amount of time Habitat Group staff could spend on this project, so the Maine Chapter of The Nature Conservancy has taken the lead.

### ***Lynx Habitat Work***

We used GIS extensively to analyze telemetry data from the lynx project. We calculated both annual and seasonal home-range sizes and estimated the amount of home-range overlap between individual lynx. These calculations allowed us to make an estimate of population size within the study area. We then overlaid the telemetry locations onto vegetation maps to determine which habitats lynx were using most frequently. It was no surprise that lynx were most drawn to habitats that supported high snowshoe hare (their primary prey) densities, such as conifer-dominated regeneration. Similar GIS work is being done with telemetry data for black racer snakes in southern Maine and will be used to examine snake movements in fragmented vs. large blocks of habitat. Depending on the quality of data inputs, GIS provides biologists with faster and more detailed habitat and home-range analyses than would otherwise be possible.

## ***Significant Vernal Pool Mapping***

Significant Vernal Pools (SVPs, also referred to as seasonal forest pools) are natural, temporary to semi-permanent bodies of water occurring in shallow depressions that typically fill during the spring or fall and may dry up during the summer. Protected under Maine's Natural Resources Protection Act (for more information about NRPA protection of SVPs, visit [www.maine.gov/dep/blwq/docstand/nrpa/vernalpools](http://www.maine.gov/dep/blwq/docstand/nrpa/vernalpools)), SVPs provide high value habitat for a suite of specialized amphibians, reptiles, and invertebrates. Because of their small, ephemeral nature, it would be impossible to proactively map all of Maine's vernal pools using aerial imagery as we do other wildlife habitats. However, knowing where SVPs are located is important to protecting the resource so we are building a database of known pools as they are field-verified by Maine DEP staff and other qualified individuals. This database, which includes the location of each pool, is being shared with MDEP for NRPA regulatory purposes and BWH for town planning and outreach.

## **PROTECTING WILDLIFE AND HABITAT FROM OIL SPILLS**

### ***Petroleum Products and Wildlife Response in Maine***

Maine's coastline, islands, and inland waterways provide valuable habitat for wildlife. An oil spill could harm both animals and the habitats they need. Over 20 billion gallons of petroleum products are shipped into Maine annually. The Inland and Coastal Surface Oil Spill Clean Up Fund, derived from a fee for transporting these petroleum products in Maine, provides MDIFW with resources to plan for and respond to oil spills that could affect wildlife and their habitats. MDIFW's roles in spill response include recovering oiled wildlife, preventing un-oiled wildlife and habitats from becoming oiled, assessing damage to natural resources, and working with the responsible party to either restore the damaged natural resources or to mitigate for the loss. We work closely with Maine's Department of Environmental Protection (MDEP), Department of Conservation, and Department of Marine Resources (the other state natural resource trustee agencies) to update and improve a natural resource damage assessment plan for coastal spills. Being well prepared is critical to accomplishing these tasks and minimizing damage. We coordinate spill response planning with numerous state and federal agencies.

### ***2008 Oil and Hazardous Material Spills***

Please report all spills by calling the MDEP's 24 hour spill hotline at 1-800-482-0777.

<http://www.maine.gov/dep/rwm/emergspillresp/index.htm>

<http://www.maine.gov/dep/gis/datamaps/index.htm#Google%20Earth%20Maps>

The MDEP tracks the importation of petroleum products including kerosene, #2 fuel oil, diesel, #6 fuel oil, jet fuel, lube oil, gasoline, crude, and asphalt. From April 2007 through March 2008, Maine imported almost 2 billion barrels (1 barrel = 42 gallons) of petroleum products per month. During the year of 2007, #2 fuel oil alone accounted for almost 10 billion barrels.

As of June 2008, MDIFW was contacted by MDEP and USCG about 6 spills this year. The first spill occurred on February 14 when a kerosene delivery truck overturned on the Allen Avenue Extension Bridge in Falmouth spilling approximately 1,200 gallons of kerosene, mostly into the Presumpscot River. Many people view this area daily while driving on I-295 into Portland or from the Maine Audubon Society Gilsland Farm Center. Fortunately, MDEP's quick response ensured that this ecosystem remained largely undisturbed. The next three spills reported to MDIFW were at residential pond camps with leaks from external heating oil tanks. There were many similar leaks in 2008 and MDEP is urging all homeowners with outdoor heating tanks to properly protect them from the elements. Severe flooding in Aroostook County in April/May also resulted in waste oil leaks. The largest spill to date was an aqueous ammonia/water release at a terminal in Searsport. A valve failure released approximately 5,500 gallons into a drainage ditch. For each of these spills, MDEP was able to monitor wildlife in the area while supervising site cleanup and no action was taken by MDIFW aside from some site visits.

### ***Maine/New Hampshire Area Committee***

MDIFW is part of the Maine/New Hampshire Area Committee, which is comprised of federal, state, and local officials who prepare an Area Contingency Plan for oil spills. Many individuals from oil spill response organizations, industry, and environmental groups assist the Committee's planning process and play a key role in preparedness across the region. In June 2008, MDIFW's Oil Spill Wildlife Biologist will attend a response drill organized by the Area Committee and hosted by Sprague Energy Co. in Portsmouth, NH. This drill will simulate a liquified asphalt spill in the Piscataqua River. Similar drills are held every three years. The Area Committee maintains several online resources:

- Marine Oil Spill Contingency Plan, which includes information about Maine's wildlife relocation, deterrence, and rehabilitation plan – <http://mainegov-images.informe.org/dep/rwm/publications/pdf/contplan.pdf>



- Geographic Response Plan, which as maps of protection strategies for priority areas along the Maine and New Hampshire coast – <http://mainegov-images.informe.org/dep/rwm/emergspillresp/geogplans.htm>
- Environmental Vulnerability Index maps that depict environmental resources along the coast of Maine most at risk from oil spilled into the marine or estuarine environment <http://www.maine.gov/dep/rwm/emergspillresp/evi/intro.htm>

## **Wildlife Rehabilitation**

### **State of Maine Wildlife Rehabilitation Contractor**

MDIFW just renewed our 5-year contract with the International Bird Rescue Research Center (IBRRC at [www.ibrrc.org](http://www.ibrrc.org)) of California to assist with oiled wildlife response. Since forming in 1971, IBRRC has rescued over 140 species of wild birds, mammals, reptiles and amphibians around the world. IBRRC helps MDIFW train our staff, local wildlife rehabilitators, and volunteers.

### **MDIFW Staff Training**

MDIFW staff training includes lectures and field drills focused on finding, collecting, and processing oiled wildlife. We try to incorporate other agencies such as USFWS, MDEP, and NOAA into our drills whenever possible.

### **Wildlife Rehabilitators**

MDIFW maintains a list of state and federally licensed wildlife rehabilitators in Maine, from which we have formed a Maine Oiled Wildlife Rehabilitator Working Group. This smaller group focuses on the knowledge and equipment that rehabilitators need to take in oiled wildlife. They will meet twice a year. They are assisting MDIFW with designing an Oiled Wildlife Rehabilitation Trailer that could be transported to a spill site to clean and stabilize oiled wildlife. The Working Group will also help develop training for the rehabilitation community. These trainings usually include a 2-day seminar and laboratory workshop with hands-on washing of “oiled” wildlife and the feeding practices needed to stabilize them.

### **Volunteers**

MDIFW also maintains a list of volunteers to assist with spill response. We notify these volunteers of upcoming trainings. If you are interested in being added to our oiled wildlife volunteer mailing list, or need to update your contact information, please send your name, address, phone and email contact information to our Oil Spill Wildlife Biologist at:

Jordan Bailey  
Maine Department of Inland Fisheries and Wildlife  
650 State St.  
Bangor, ME 04401  
[Jordan.Bailey@maine.gov](mailto:Jordan.Bailey@maine.gov)  
207-941-4448

*Note: Our oil spill program is funded by the Inland and Coastal Surface Oil Spill Clean Up Fund, which is a dedicated fund maintained by a per-barrel fee assessed on all petroleum products entering the state. This fund is administered by the Maine Department of Environmental Protection.*



## WILDLIFE MANAGEMENT SECTION

Maine has an amazing diversity of natural features and wildlife; from coastal marshes and mud flats that are the stepping stones for long migration flights, to large tracts of northern forest land that support pine marten. When development pressure has the potential to impact Maine's wildlife, or Maine people have wildlife concerns, our Regional Wildlife Biologists become a critical point of contact. In addition to being a wealth of information on wildlife, our Biologists know and track the land use changes that impact Maine's natural resources.

Staff time spent researching and collecting data is critical in understanding wildlife patterns to develop and implement our management programs. This information is also used to comment on environmental reviews for development projects, help people solve nuisance wildlife conflicts, propose changes in hunting and trapping seasons, allocate any-deer permits, conserve, protect and enhance habitat and provide recreational opportunities.

Successful management programs are possible through regulations and field work, and equally important partnerships with other organizations, volunteers, large and small landowners, outdoors enthusiasts such as you, and our own Wildlife Management Areas (WMA's). Wildlife Management Areas support unique habitats that enhance hunting and wildlife watching experiences for everyone. Read on to learn how we manage these unique areas and what opportunities they offer visitors. You can find additional information on the IF&W website, [www.maine.gov/ifw](http://www.maine.gov/ifw).

--John Pratte

*Wildlife Management Section Supervisor*

## IMPLEMENTING SUCCESSFUL WILDLIFE MANAGEMENT

### REGIONAL WILDLIFE MANAGEMENT PROGRAMS

#### ***Recreational Opportunities on Wildlife Management Areas***

Wildlife recreation such as hunting, fishing, and wildlife watching have dwarfed Maine's other recreational industries, with such activities providing over \$1.5 billion to the Maine economy in 2006 alone. The Department manages WMA's specifically for wildlife habitat and recreational opportunities through a self-funding Land Management Program. One of the great benefits to the public is more than 60 WMA's throughout the State ranging in size from 111 to 6,838 acres, totaling over 100,000 acres providing wildlife habitat, public access, and low impact recreational opportunities in perpetuity.

The WMA's consist of a myriad of habitat types and recreational opportunities: from backwater flowages supporting rare, threatened and endangered flora and fauna, to dense softwood canopy cover used by deer during harsh winter stretches, to old-fields and dense young forest growth ideal for ruffed-grouse courting, nesting, and brood rearing. These same habitat types often provide ideal places for recreational activities to the hunter, fisherman, hiker, naturalist, horse back rider, photographer and many other recreational users.

The Department works with local and regional partners conserving additional lands centered upon numerous WMA's to provide trailhead parking, signage and maintenance activities. In general, improved facilities such as picnic tables, restrooms, and other amenities are not provided, giving users the opportunity for a backcountry experience in many locations. In addition, habitat enhancement plans consider existing activities, trails and recreational opportunities with efforts aimed at enhancing those uses. Habitat enhancement activities also provide more enjoyable wildlife viewing opportunities by providing direct views, herbaceous food for browsing opportunities and the provision of preferred habitat for multiple species. Water access points are also provided by many of our WMA's for additional recreational and habitat management opportunities.

The numerous recreational activities available on WMA's are because of the self-funding activities of our Lands Management Program and whether you enjoy taking a hike along an old gravel road, photographing wildlife or plants in a natural setting, sharing your paddling experience with local waterfowl or waiting one chilly October morning in your deer stand or duck blind, please come and enjoy one of the numerous Wildlife Management Areas – they are here for you. For a list of recreational activities on WMA's, please visit our web-site at: <http://www.maine.gov/ifw/wildlife/management/wma/index.htm>

--Ryan Robicheau

*Lands Management Biologist*

## ***Jamie's Pond Wildlife Management Area***

Forest harvests are an important habitat management tool, which in turn is an important part of wildlife management. At Jamie's Pond WMA the process begins by gathering information to create a management plan. Our staff uses information from many sources to develop the management plan some of which are:

- ♦ **Regional Wildlife Biologists** – Local knowledge of development trends, habitat losses, recreational pressures, wildlife population trends and additional needs.
- ♦ **Aerial photos** – Used to easily identify key habitat features.
- ♦ **Soil Survey Guides** - Identify how certain soils affect tree growth, which areas are vulnerable to wind throw or erosion and areas that may support rare plant communities.
- ♦ **Wetland inventory, shoreland zoning and floodplain maps** – Identify areas with special permitting requirements or operation standards such as features requiring buffers, potential stream crossings, deer wintering areas, etc.
- ♦ **A Natural Resource Inventory** – For the Jamie's Pond management plan, the Department and the Maine Natural Areas Program inventoried everything from turtles, plants, salamanders, butterflies, dragonflies, snakes, birds to specific communities. Endangered or threatened species may just require a wide buffer, like around eagle nests or vernal pools. The forester does a final check to locate and protect special features such as vernal pools, wildlife trees being used for nests by birds or animals, and dead or dying trees that could be future wildlife trees.
- ♦ **Archaeological and Cultural Features** – Identified through a check with the Maine Historic Preservation and site visits to identify old cellar-holes, cemeteries, individual gravesites, hiking trails, snowmobile trails, roads, and other features to avoid or buffer as part of the forest harvest plan.

All this information is woven into a long term management plan to balance the needs of wildlife, recreational interests, biodiversity, and rare or unusual plants that is reviewed by our regional staff and species specialists at our Bangor office. This will be the Department's first comprehensive forest management harvest at Jamie's Pond WMA and will enhance the wildlife resource values of the area. Our first entry was to thin two overstocked white pine stands and buffer around some raptor nests. This entry will provide for a riparian buffer around the pond, inlet stream and hiking trails and begin the process of improving the quality of the portion of a deer wintering area located on the WMA.

If you haven't yet enjoyed the trails and wildlife viewing afforded to you at Jamie's Pond WMA I would encourage you to plan a visit this summer and a follow up visit for after our forest management activities to see our habitat improvement work. I look forward to answering your questions at informational sessions we host as we conduct forest operations on properties around the state.

--James Connolly, Regional Wildlife Biologist  
*Region B, Sidney*

## ***Birding the Wildlife Management Areas***

With about half of our WMA's containing significant amounts of wetland habitat, they are hot spots for waterfowl and wading birds offering unparalleled birding close to home. With a management focus on wildlife, these areas are quite diverse and provide excellent habitat for most of Maine's native bird species. Statistics from the 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation for Maine show that about 450,000 Mainer's watch birds. If you are one of those people, consider yourself invited to go birding at a WMA near you.

Here is a cross section of some of our WMA's with excellent birding opportunities.

**Kennebunk Plains WMA** - The habitat is mostly grassland with two state endangered species found here; the grasshopper sparrow and black racer (a snake). Male grasshopper sparrows can be easily seen singing from low perches during breeding season. The open grassland is bordered by pitch pine and scrub oak where towhees, brown thrashers and Canada warblers can be found. Other possible birds to see here are eastern meadowlark, blue-winged warbler, horned lark and willow flycatcher.

In August the Plains are covered with state threatened Northern Blazing star in full bloom which is a spectacular sight and worth the trip by itself. This WMA is just 2 miles from the Maine Turnpike in Kennebunk, look for a small fenced parking area on the north side of Route 99 with maps and information about this site. Please do not bring your dogs due to the sensitivity of the grasshopper sparrows.

**R. Waldo Tyler WMA** (aka Weskeag Marsh) is located in South Thomaston off Buttermilk Lane on the Weskeag River. This 762 acre area is primarily tidal saltmarsh with some upland fields and forest. Wilson's snipe and several species



of rails are found in the saltmarsh along with olive-sided flycatcher and Lincoln's sparrows. Other possibilities here are osprey, northern harrier and pied-billed grebe. This area has been the site of considerable saltmarsh restoration which involved plugging ditches previously designed to drain the marsh for hay production and mosquito control.

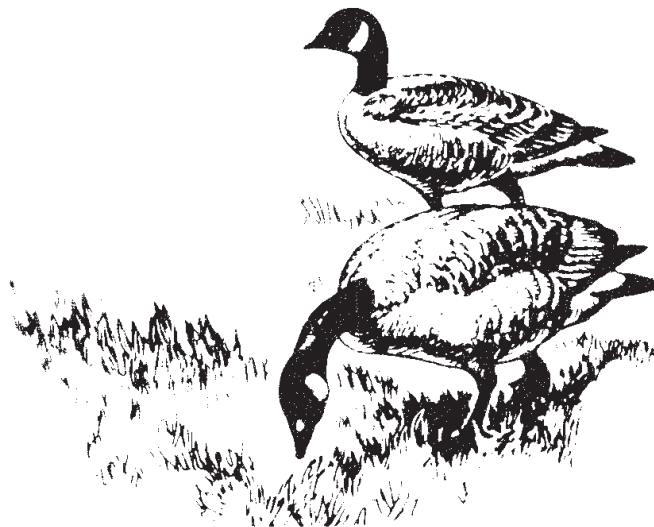
**Mattawamkeag River WMA** is located in Drew Plantation about 10 miles east of the Penobscot River at Mattawamkeag. The best access is by canoe, put in at Upper Drew, off Route 171 to float the river or off Rt.170 on the Mud Pond Rd. The area consists of an emergent marsh around Mud Pond, peatlands, shrub wetlands and lowland conifers along the river. Expect to see snipe, northern harrier, great blue heron and several species of waterfowl. Richness of the mix of habitats provides for species like Bald Eagles, moose and bear along with the wealth of wetland associated birds.

To locate a WMA's go to the department's website at <http://www.maine.gov/ifw/wildlife/management/wma/index.htm> Why not give our WMA's a try and see how many species you can observe. And you thought the WMA's were only for hunting.

--Joe Wiley, Wildlife Biologist

### ***Assisting Wayward Wildlife***

Part of our job as regional wildlife biologists is responding to calls from persons reporting injured wildlife, or wildlife caught, stuck, or snarled in something belonging to a human. Tools of extraction can include immobilizing drugs, noose poles, boats, rope, nets, fencing, winches, tripods, and even a Labrador retriever. The following are two memorable incidents from region D.



#### **On Frozen Pond**

One recent December I received a call about a Canada goose with a broken wing. It was residing on an iced-over farm pond in a big field next to a secondary road. Due to its visibility, the plight of this bird generated several telephone calls to unresponsive third parties. Fortunately I was able to meet with the farmer upon getting the call. I was also lucky to have my black Labrador retriever Dusty with me that day.

When I arrived the adult Canada goose was sitting on about one inch of ice in the middle of a large farm pond. I could see that one wing was broken at the "elbow" and there was no way this bird was going to leave the safety of the pond. Further, my limited knowledge of physics let me know that one inch of ice equals one cold swim. So with just a big net in hand this situation was going nowhere. This may have been why other calls about this bird resulted in no conclusion.

My lab was very experienced at retrieving waterfowl and was letting me know she wanted in. Because she was gentle when retrieving birds shot in front of her, I figured involving her could do no harm. Though the ice looked like it could support a dog, I wanted to be safe and secured a 100-foot yellow rope to her. Lining her up on the bird I gave the command "back" which means go get it and stay on a straight course. She took off like being shot out of a cannon.

Seeing an oncoming 80-pound black dog trailing a long yellow rope was all the goose needed to realize that the safety of the pond was quickly evaporating. At the same time the dog reached the shore, the goose took off flapping and running towards the field. When the dog got onto the ice, legs were at full speed but her forward momentum came to near zero as she just spun on the ice. When the dog reached the opposite shore and the traction afforded by bare ground, the goose's lead was easily a couple hundred yards.

Streaking across the field went the running and flapping goose trailed by a big black dog, followed by a snaking, bouncing 100-foot length of yellow rope. They traveled at rather high speed across this huge field in a long, gentle arc, with the farmer and me back at the pond watching. As the dog slowly closed in on the goose it appeared that their route might eventually circle back near us. We jumped behind a big bushy white pine, net in hand, and watched as the two came closer and closer. Amazingly, with only a 20-yard lead the goose was about to run right past my hiding place. When it did, I stuck out the big net and the goose ran right into it. Incredulously, the farmer asked how in the world I ever got my dog to do that and I replied, "just lot's of training". Later that day my lab and I delivered the Canada goose to a licensed wildlife rehabilitation facility.

--Chuck Hulsey, Regional Wildlife Biologist  
*Region D, Strong*

### **Parachute Training**

Sometimes interesting wildlife adventures begin with an interesting location. In November of 2006, we were granted access to the secure Naval Facility in Redington Township. This facility is used to run the Navy's SERE School (Survival, Evasion, Resistance, and Escape). The instructor's from this school contacted the department about a bull moose that was entangled in a parachute. Of course, we couldn't help but to ask the Navy instructors "What secret program does the Navy have that involves moose jumping from perfectly good aircraft?" Obviously, there is no secret program. The parachute was being used as temporary shelter, and the moose became entangled as it walked under it. It is not uncommon for wildlife to become entangled in ropes, wire, TV/phone cable, fencing, or even swing-sets. This moose was lucky that the caring instructors at the Navy Facility found it, most animals have expired long before they are discovered.

Not knowing exactly what we would run into, we gathered all of our animal-capture gear and headed to Redington. We quickly assessed the situation, and noticed that the 700 lb, 2.5 year-old bull had not been entangled for very long, but definitely need to be chemically restrained in order to free him. Moose are notoriously unappreciative of such assistance and can be very dangerous if they are not handled properly.

Assisted by one of the Naval instructors, I was able to get close to the moose without exciting him, and delivered the proper drug dosage via dart and dart gun. We then backed off a couple hundred yards to join the rest of the group and waited for the medication to take effect. The medication we use affects the central nervous system of the moose and disengages the animal's ability to use voluntary muscles, but they still can react to stimulation including voices, touch, or light.

After several minutes the drugs start taking effect, and the moose was down, out, and snoring (which is a good sign of deep anesthesia). Once the animal is down, we cover its eyes and ears to protect them from dirt and debris, and to reduce stimulation from light and sound. We then position the moose on his chest to make sure he doesn't build up too much gas from rumination, and to maintain a clear airway from breathing. Luckily there were five Navy instructors to help move the moose into position. We then monitored vital signs and asked the instructors to put their knives to work freeing the moose from the parachute, cords, and a small log that had gotten twisted in the mess.

After an hour and a half the moose started showing signs of recovery. We administered a drug to reverse the effects of the others and within 15 minutes he was up and wandered into the fir and spruce. It was a good day and the procedure went well, thanks to the action and assistance of the Navy SERE instructors.

Chemical immobilization is an effective tool, but not a simple procedure nor is it as graceful as portrayed on television. When the decision is made to chemically immobilize an animal, the animal is treated like a patient. Because our "patients" are wild, scared, worked-up, and sometimes injured, successful outcomes take a lot of preparation and care.

--Bob Cordes, Regional Wildlife Biologist  
*Region D, Strong*

### **Human-Wildlife Conflicts**

Often home and camp owners are at their wits when it comes to dealing with nuisance wildlife issues that may be causing damage to their property. Although there are numerous critters out in the wild that each of us have dealt with I will provide an example of how one might handle a nuisance raccoon.

There are state and federal laws protecting wildlife and regulate which species can be trapped, hunted or killed. Raccoons are protected furbearers in Maine and are illegal to kill unless found in the act of attacking, worrying or wounding a person's domestic animals or domestic birds or destroying a person's property, in which case it must be reported to a Game Warden (Gray-657-2345, Greenville- 695-3756, and Ashland-435-3231) within 12 hours.

Remember that prevention is much more cost effective than the cure when dealing with nuisance wildlife and to treat the problem not the symptom. Anytime you are uncertain of how our regulations might impact your decision or for information on additional animals visit our website.

In dealing with nuisance wildlife four main points need to be considered in order to resolve the potential problem. With each animal you should consider; 1) Prevention, 2) Habitat Modification, 3) Trapping, and 4) as a last resort, Lethal Removal.

Prevention: There are many strategies for resolving nuisance raccoons.

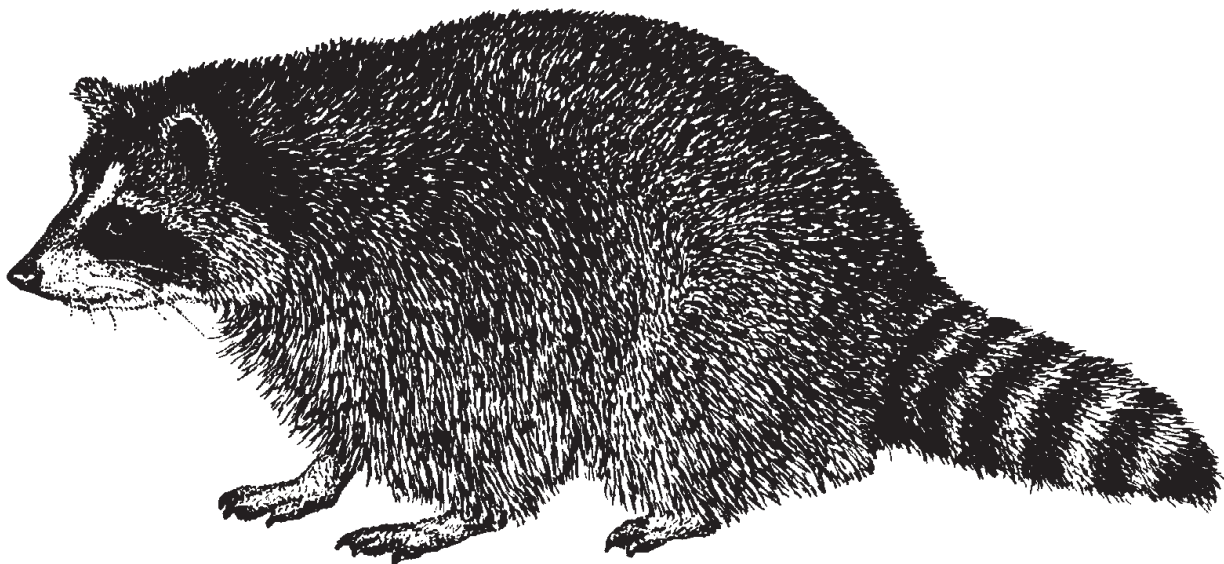
- A very effective way is through the use of fencing with a “hot wire” and electric fence charger at the top of the fence.
- To discourage raccoons from raiding garbage cans store garbage in metal or plastic containers with tight-fitting lids. It may be necessary to place garbage in secondary container or garage until the morning of garbage pickup to reduce odors which often attract unwanted critters. From my own experience I have found that clamping or wiring a container to a stationary post with easy disconnect for garbage pickup prevents tip-over if raccoons get on containers.
- In camps you can prevent raccoon access to chimneys by securely fastening a commercial cap or sheet metal and heavy screen over the top of the chimney.
- Removing overhanging branches and securing sheet metal at least 3 feet high around corners of the camp to access.

Habitat Modification: Remove any obvious sources of food or shelter which may be attracting the raccoons. Raccoons maintain very clean dens and can be encouraged to abandon a chimney or attic by altering those conditions. Try bright lights and a loud rock station on a radio placed in the attic or fireplace in conjunction with moth balls or ammonia soaked rags. You can place the rags in plastic bags so the odor lingers longer. Because raccoons are nocturnal only do this at night when they are more relaxed and likely to leave.

Trapping: Using a live trap like a “Havahart” is often the best choice for removing raccoons near homes and camps where there is a likelihood of capturing dogs or cats and the raccoon can be released with ease. However, raccoons can not be moved more than 5 miles to minimize the spread of rabies. One last word of wisdom, when removing raccoons in the spring and summer be aware that young may also be present, so make sure all raccoons have been removed. If any young are left behind be sure the adult will return.

Lethal: Only as last resort due to property damage or the attacking of domestic animals may a landowner shoot raccoons. If lethal control is performed the landowner must contact a warden within 12 hours.

--Richard Hoppe, Regional Wildlife Biologist  
*Region G, Ashland*





## WILDLIFE SPECIES PLANNING AND MANAGEMENT

Implementing successful wildlife management begins with a well thought out plan. To develop the plan, the Wildlife Division has developed a comprehensive species planning process. The major components of the process are: a species assessment providing what we know about a particular species or group of species; input from a Public Working Group to develop species management goals and objectives; and, finally a species management system that lays out a path to achieving the goals and objectives. Maine's species planning process is a "state of the art" approach to incorporating public input to our decision-making process. Below is summary of the species planning efforts over the past year.

Public working group was established for Northern black racers to recommend management goals and objectives for this species for the next 15 years. In response to the recommended goals and objectives for Northern black racers, species specialist Jonathan Mays developed feasibility, desirability, capability of the habitat, and potential consequences statements; identified potential problems in reaching the goals and objectives; and presented some possible strategies to overcome those problems. The recommended goals and objectives were presented to the Commissioner's Advisory Council on February 20, 2008 for their approval and adoption. Beth Swartz completed a species assessment for freshwater mussels, and the Wildlife Division reviewed it prior to convening a public working group. The Freshwater Mussels Working Group met on March 28, 2008 to recommend management goals and objectives for these species; documents are currently under review. A public working group was also convened on September 2007 to review current management goals and objectives for moose (which were established in 1999) to determine if they needed to be revised. The initial decision by the working group was to stay the course until the Department is able to gather better data on moose densities and the effects of winter ticks on moose survival. Subsequently, some members of the working group have raised management issues that a more comprehensive working group will address in a larger forum involving multiple species management in Northern and Eastern Maine. Lindsay Tudor completed a management system for the Least Tern and Piping Plover; and the Wildlife Division reviewed and approved it on July, 27, 2007.

During the coming year, we plan to complete species assessments for American marten, fisher, Canada lynx, peregrine falcon, grasshopper sparrow, and ringed boghaunter. We also plan to convene public working groups to address the American marten and fisher; Canada lynx; Grasshopper Sparrow and Upland Sandpiper; Peregrine Falcon; and ringed boghaunter. Also, we plan to develop management systems for the American black bear; black racer; freshwater mussels; Island-nesting terns; Red-necked Phalarope; Bald Eagle; Golden Eagle; and ringed boghaunter.

If you are interested in reviewing the Wildlife Division's species planning documents, please visit our website at <http://www.maine.gov/ifw/wildlife/species/plans/index.htm>

## ENDANGERED AND THREATENED SPECIES CONSERVATION

Perhaps the most challenging area of wildlife management is recovery of Endangered and Threatened species. The Wildlife Division staff has invested considerable effort in identifying those species at risk and developing plans to recover these species to the point of they can be delisted. You can find specifics of what the Wildlife Division is accomplishing for Endangered and Threatened wildlife in the following sections of this report.

Since European settlement, at least 14 species of wildlife have been extirpated from Maine. To prevent further losses, the Maine Endangered Species Act was enacted in 1975. In 1986, Maine's first list of 23 Endangered and Threatened species was adopted. After MDIFW reviewed the status of many of Maine's wildlife species in the mid-1990s, the Legislature added 20 new species to the list in 1997. The most recent revision of the list occurred on May 24, 2007. Changes included 14 new listings, 1 delisting, a change of status from Endangered to Threatened for 1 listed species, and adding the qualifier "breeding population only" to 2 species already listed as Endangered. To obtain a PDF version of what was proposed to the Legislature and eventually enacted, go to [http://mainegov-images.informe.org/ifw/wildlife/species/pdfs/etlist\\_recommendations.pdf](http://mainegov-images.informe.org/ifw/wildlife/species/pdfs/etlist_recommendations.pdf)

It should be noted that there is now a separate list of state Endangered and Threatened marine species. The Maine Legislature has given The Maine Department of Marine Resources responsibility for maintaining and updating that list. <http://janus.state.me.us/legis/statutes/12/title12sec6975.html>

--George J. Matula, Jr.  
*E&T Species Coordinator & Wildlife Planner*

## BIRD GROUP



The breadth of the Bird Group's programmatic responsibilities involve stewardship of 223 bird species that nest in Maine, and many more that migrate through or winter in Maine. Several of Maine's birds occur statewide, but others occur only in portions of the state. Maine has a very diverse landscape and consequently a myriad of habitats suitable for various bird species. At least 29 inland breeding species of birds reach the northern limits of their breeding distribution in Maine, 28 species the southern limits, and 2 species their eastern limits. In addition, many of Maine's island-nesting seabirds reach their southern breeding terminus on Maine's islands, like Atlantic puffins and razorbills. The peregrine falcon and wild turkey have been reintroduced in Maine. The peregrine population is slowly increasing, and the wild turkey has expanded into areas beyond our expectations. Other species, such as the turkey vulture, blue-winged warbler, evening grosbeak, American oystercatcher, sandhill crane and several species of wading birds, have expanded their

breeding range into Maine at various times over the past century. Bird conservation, management, and research in Maine is both very challenging but very rewarding.

**Brad Allen, Bird Group Leader** – Oversees group activities and budgets, currently serves as a co-investigator on a common eider survival study and serves on the Continental Technical Team of the Sea Duck Joint Venture. Brad coordinates Department interests in most seabird research and management activities.

**Lindsay Tudor, Wildlife Biologist** - Coordinates the Department's Migratory Shorebird Program with current emphasis on shorebird habitat protection under the Natural Resources Protection Act. Lindsay's research involves the ecology of purple sandpipers wintering in Maine and her primary survey responsibilities include all species of shorebirds, least terns, piping plovers, and harlequin ducks.

**Thomas Hodgman, Wildlife Biologist** - Develops and implements programs and surveys to assess the status of songbirds in Maine and coordinates several priority bird research programs. Tom's recent focus is working with a graduate student studying rusty blackbirds and monitoring grassland birds. Tom routinely provides technical assistance and advice to staff and the Wildlife Management Section regarding bird migration and windpower development.

**Kelsey Sullivan, Wildlife Biologist** – Kelsey coordinates waterfowl banding programs, surveys, and research to assess the status of gamebird populations in Maine. Gamebird species that Kelsey is responsible for include ruffed grouse, American woodcock, wild turkeys, several species of ducks, and Canada geese. He is Maine's representative on the Atlantic Flyway Council Technical Section.

**Charlie Todd, Wildlife Biologist** – Charlie has devoted nearly 30 years of his professional career to the recovery of bald eagles in Maine and serves on the national Bald Eagle Recovery Team. Charlie also leads MDIFW's peregrine falcon recovery program. Charlie's experience makes him a valuable advisor to other staff on all Endangered and Threatened bird species issues.

**Danielle D'Auria, Wildlife Biologist** – Danielle is the Department's species expert on marshbirds, wading birds, common loons, and black terns. Over the past year she has also devoted a great deal of effort to the Landowner Incentive Program, bald eagle surveys, and coordination of marshbird and black tern surveys.

The Bird Group would like to thank the following dedicated biologists who have assisted us with our bird conservation and management tasks over the last year: Betty Hayes, Sarah Fleming; Sarah Spencer, John Drury, Glen Mittelhauser, Dave Hiltz, Greg Runge, Chris West, Luke Powell, Don McDougal, Jim Dyer, several students from Nokomis Regional High School, Bill Hanson, Chris DeSorbo, Wing Goodale, Bruce Connery, Lesley Rowse, Joe Wiley, Margo Knight, Don Mairs, Ron Joseph, Cheryl Daigle, Jordan Kramer, Angie Chessey, Diane Winn, Marc Payne, Maine Audubon, and MDIFW regional staff with noteworthy contributions from Doug Kane, Bill Noble, Tim Obrey, Chuck Hulsey, and Bob Cordes.



## BIRD CONSERVATION AND MANAGEMENT

### ***Nokomis Regional High School Surveys Black Terns for 17<sup>th</sup> Year***

Maine is home to several tern species, but only one is restricted to inland freshwater marshes for breeding: the Black Tern. After showing a significant decline continent-wide between the 1960s and the 1990s, the black tern was listed as Endangered under the Maine Endangered Species Act in 1997. It is the rarest species of tern in Maine and is identified as a Priority 1 Species of Greatest Conservation Need in Maine's Comprehensive Wildlife Conservation Strategy (Wildlife Action Plan). Habitat loss and degradation on the breeding grounds are thought to be major contributing factors in their decline. In Maine, black terns nest in large, shallow emergent marshes associated with lakes, impoundments, and slow-moving streams.

For the 17th year in a row, volunteers from Nokomis Regional High School (Nokomis) in Newport visited several of these shallow emergent marshes throughout the state, searching for nesting black terns. Results from their surveys indicate that Maine's breeding population of black terns in 2007 was 109 breeding pairs at 6 sites. The number of breeding pairs has shown a gradual increasing trend over the last 15 years from 49 pairs in 1993. The average number of breeding pairs over the last 15 years was 87; over the last 10 years was 95, and over the last five years was 110. Despite the apparent increase, the number of breeding pairs at specific sites fluctuates from year to year; and the number of active breeding sites still remains low. From 2006 to 2007, the number of breeding pairs decreased at 4 out of 6 sites (44% decline), and increased at the remaining 2 sites (70% increase). Each year they've been found breeding at 5-8 sites throughout the state.

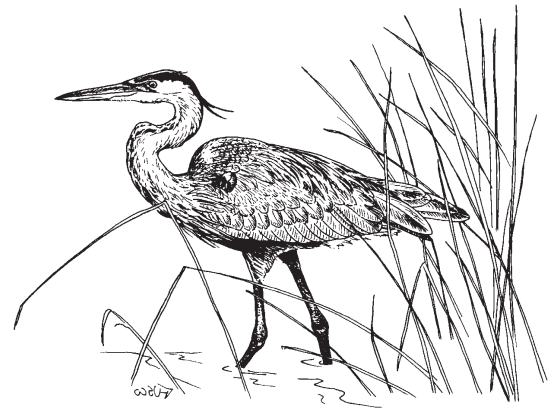
In partnership with Nokomis advisors and students, MDIFW will continue to survey all historic and current breeding sites in order to better understand the species' population status and distribution, provide adequate habitat management and protection, and ultimately enable recovery. MDIFW greatly appreciates the time and effort Nokomis has contributed to these rare birds.

*This work is supported by funds from State Wildlife Grants as well as state revenues from the Loon Conservation Plate and Chickadee Checkoff funds.*

--Danielle D'Auria

### ***Great Blue Heron Census Planned for 2009***

The Great Blue Heron is often touted as one of the most widespread and adaptable wading birds in North America. It certainly is no stranger to Maine. They can be seen foraging in tidal marshes, along riverbanks, and even in open grasslands. In flight, their form is reminiscent of a prehistoric creature: large body, long snake-like neck with a sharp dagger for a bill, all carried about by those ever so graceful wings that when wide open may stretch 2 meters across. Upon liftoff, their squawk further confirms their prehistoric essence. Though they tend to forage alone; their nesting habits are the complete opposite. Colonies can contain anywhere from a few pairs to several hundred, and often multiple nests occupy the same tree. Location of a colony is somewhat predator driven, but is also determined by the proximity of quality foraging habitat. In addition, human disturbance can be a real threat to a colony's continued occupancy.



Recent observations have indicated that colonies in Maine may be declining. Colonies that once held scores of active nests, have dwindled to a few pairs or have been abandoned altogether. Have the birds simply redistributed themselves across the landscape, occupying different sites that support fewer pairs, or is there a true decline in the number of breeding great blue herons? A quick glance at North American Breeding Bird Survey data for Maine indicates a 6.5% annual decline between 1980 and 2006. Although most would still argue the great blue heron is a common sighting in Maine, that's a fairly substantial declining trend and thus has recently warranted its listing as a state Species of Special Concern. Unlike Endangered or Threatened status, Special Concern is an administrative category established by policy, rather than by regulation, and is used for planning and informational purposes only. Basically, it's a way of saying, "let's keep an eye on this species and make sure it's not really in peril."

The Maine Department of Inland Fisheries and Wildlife conducts periodic breeding censuses of heron colonies, primarily along the coast. The last thorough census was done in 1996. Observations and reports of numbers of nests for most colonies have filtered in over the past 12 years, but have primarily been incidental and opportunistic in nature and therefore haven't shed enough light on the situation. Therefore, MDIFW will be conducting a coast-wide great blue heron aerial census in spring of 2009. As mentioned earlier, many of the larger colonies documented in past censuses have

since broken up into smaller colonies and moved to other locations. In order to maximize the efficiency of our census and minimize flying time, **we are asking for YOUR help identifying where active colonies are located**. If you know of a colony that was active in recent years, please share your observation with Danielle D'Auria, at [danielle.dauria@maine.gov](mailto:danielle.dauria@maine.gov), or 941-4478.

--Danielle D'Auria

### ***Common Eider Survival Investigation – Are Current Harvests Sustainable?***

Concern over the status of Common Eiders has increased recently as nesting populations may be declining. First, it is important that you know that approximately 100 years ago only 2 pairs of eiders nested along the entire Maine coast. The recovery of the eider in Maine is a little known but spectacular wildlife success story. At the beginning of the 20<sup>th</sup> century (1900), laws were passed to stop egg-collecting and curtail year-round shooting. As a result of these protective laws and careful management, failing island economies (people moved from the islands to the mainland), and the availability of suitable nesting conditions, the eider population grew.

Sixty years ago few people hunted this growing eider population. Perhaps because they had ample numbers of other more tasty waterfowl to shoot. Hunting pressure on eiders began to increase in the 1980s in eastern North America as opportunities to hunt other species, such as black ducks and Canada geese, were reduced. Today, waterfowl hunters from all over the United States travel to Maine to hunt this large sea duck. But eiders are not a species of waterfowl that can sustain high harvest rates. Compared to other waterfowl, eiders are characterized by high survival of adults under normal conditions. With this in mind, we designed a study to determine current survival rates. Once we determine these rates, we can predict if current trends in harvest rates in Maine are sustainable.

In 2002, we launched a multi-agency study to determine the survival rates of both male and female eiders. Since 2002, we have banded over 10,000 eiders. We have banded > 6,000 females and > 4,000 males. Further, we have >1,100 recaptures of previously banded birds and > 575 recoveries of dead birds. The birds we band are a portion of a larger population of eiders that nest anywhere from Newfoundland, Quebec, Nova Scotia, New Brunswick, and Maine, and winter as far south as Rhode Island. Preliminary analyses indicate that survival rates of female eider ducks remains very high and above 90% as was reported during earlier band analyses. Male survival rates are somewhat lower and preliminary results indicate they are in the 86-89% range. This was not unexpected as hunters generally select and shoot males in higher proportions.

We have some control over waterfowl harvests. Natural mortality events we do not. The habit of nesting in high concentrations on small islands makes this bird vulnerable to the spread of disease. Avian cholera, a bacterial disease that spreads throughout the nesting colony, often leads to high mortality among hen eiders. In 2002, an outbreak was documented in the St. Lawrence Estuary that killed nearly 7,000 female eiders. These adult females are birds that should have lived to produce ducklings for many more years. Why is this important to Maine? Because many of the eiders in Maine waters in the fall and winter originate in Quebec. Further, in the winter of 2006, and again this past October, nearly 3,000 eiders died on the beaches of Cape Cod, Massachusetts, many with bands from Maine on their legs. Several birds appeared to be in poor condition, many were starving, and some were heavily parasitized. According to the National Wildlife Disease Center, these birds succumbed to a yet un-described virus. Thankfully, we've not seen outbreaks of cholera here in Maine for many years and starvation is rarely a cause of eider death in Maine. We do however have significant natural predation issues in Maine. Natural predation of eiders here involves bald eagles, river otters, and mink all killing adult females while incubating. Further, significant losses of ducklings involving predation by great black-backed gulls occurs annually each June along our coastline. These natural mortality events, coupled with significant mortality of Maine eiders by hunters, challenges our ability to improve eider numbers on the coast of Maine.

--Brad Allen

### ***Woodcock***

Data collected during the 2007 hunting season, using the migratory bird Harvest Information Program (HIP) indicated that approximately 5,164 American Woodcock hunters harvested 13,695 woodcock in Maine last year. The number of woodcock hunters and days afield were both down by more than 30% compared to the previous year. This reduced hunter effort is reflected in the smaller woodcock harvest in 2007 (Table 2).



**Table 2. Maine Woodcock Hunters, Harvest and Days Afield from 1999 - 2007**

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
Hunters	10,100	8,100	11,900	4,400	6,600	4,300	5,800	7,822	5,164
Harvest	57,300	41,700	48,100	17,000	31,000	15,600	9,100	15,585	13,695
Days afield	38,300	17,200	64,900	15,900	21,400	27,000	25,200	33,243	22,581

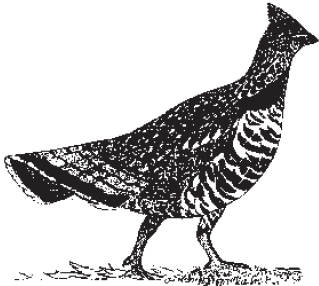


## Population Trend

Based on favorable weather this spring during nesting (not very wet) we anticipate high productivity for both grouse and woodcock. The number of singing male woodcock on survey routes in Maine was very close to the 10 year average (Table 3). A combination of favorable nesting conditions and an average number of singing males suggests a good year for woodcock productivity.

**Table 3. Average Singing Male Woodcock on Singing Ground Routes 1999-2008**

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Maine	3.55	3.67	3.25	3.03	3.3	3.34	3.44	3.38	3.11	3.25



## Ruffed Grouse

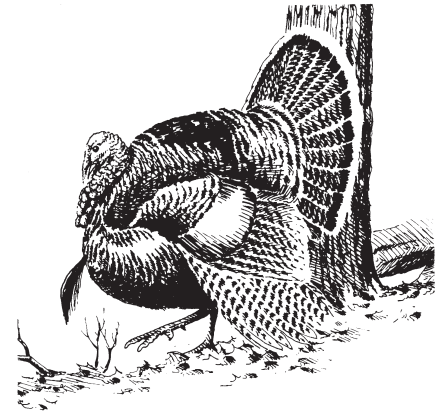
Since 1994, moose hunters have been asked to report the number of Ruffed Grouse they and their party saw or harvested during the moose hunting season. Data are compiled by geographic region and MDIFW calculates the number of grouse seen per 100 hours of moose hunting effort. Compared to a low count in 2005, grouse numbers appear to be on the rise (Table 4). Grouse tend to follow peaks and dips in their populations over time. 2007 grouse numbers are following an increased population trend. It will be interesting to see what the 2008 moose hunter data tells us.

**Table 4. Grouse Seen or Harvested/100 hours of Moose Hunter Effort in Maine 1994-2007**

-Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Statewide average	35	107	20	25	43	37	33	48	31	34	33	13	24	39

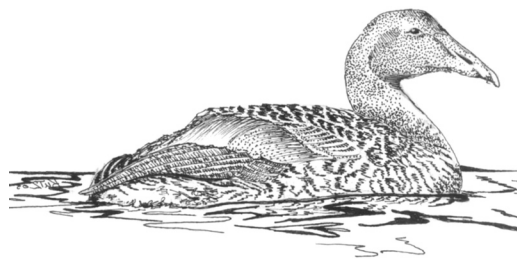
## Wild Turkey

Spring 2008 marked the fourth year without a lottery limiting the number of Wild Turkey permits issued. Preliminary data indicate that 18,195 turkey permits were sold. Hunters tallied 5,121 turkeys this past spring. This was lower than the last three years. The drop in the number of spring turkey permits could explain the decrease in harvest. Hunter success for the last four years remains around 30% though. The fall 2007 turkey season saw a major change with the addition of a fall shotgun hunt in certain Wildlife Management Districts. In the fall, both male and female turkeys are legal game. The stability of the turkey population allowed for this regulatory change. Fall harvest increased significantly with the addition of the fall shotgun season (Table 5).



**Table 5. Wild Turkey Spring (1999-2008) and Fall (1999-2007) Harvest**

Season	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Spring	890	1,559	2,544	3,391	3,994	4,839	6,236	5,931	5,984	5,121
Fall	NA	NA	NA	151	246	204	157	198	1,843	



## Waterfowl Harvest

Since 2001 the Harvest Information Program has been used to estimate waterfowl harvests (Table 6). These data are used to manage waterfowl populations to allow for healthy populations and continued non-consumptive and consumptive use of Maine's waterfowl resource. In addition to harvest data, annual systematic population surveys of wintering and breeding waterfowl by state, federal and provincial wildlife agencies provide for quality international migratory waterfowl conservation.

**Table 6. Maine Waterfowl Harvest 2001-2007**

Species	2001	2002	2003	2004	2005	2006	2007
Canada Goose	5,165	12,800	9,637	7,000	7,826	9,800	9,100
Black Duck	5,868	9,717	5,045	5,765	7,623	5,387	4,983
Mallard	7,839	15,744	12,025	12,218	16,855	12,231	12,733
Green Winged Teal	2,723	9,287	5,248	2,750	3,077	4,309	6,145
Wood Duck	7,323	7,319	3,822	4,231	6,224	5,577	5,425
Ring-necked Duck	610	1,845	459	529	699	1,331	277
Common Goldeneye	704	431	357	1,745	3,777	2,091	1,605
Common Eider	17,257	20,600	28,967	14,736	10,842	18,133	13,067
Long-tailed Duck	1,371	2,800	2,612	1,754	690	1,779	1,005
Scoters	5,371	6,400	14,721	4,210	2,168	2,288	1,828

## Harlequin Duck Surveys

Harlequin Ducks are among the rarest waterfowl in eastern North America. Harlequin ducks are also considered one of the “showiest” waterfowl species in North America. Adult males are glossy slate blue with bright chestnut sides. They also sport white and black markings including a large white facial crescent between the eye and the bill, circular white spot on the lower rear ear-coverts, vertical white stripes up the side of the neck and along the side of the breast. The females are cloaked in more subdued browns and grays. Weighing only a pound and a half, harlequins are barely half the size of a wild mallard.



Harlequins are classified as sea ducks, but, unlike most sea ducks, in the spring, the eastern population of harlies migrate inland to nest along fast moving streams and rivers located in Quebec, New Brunswick, Newfoundland, and Labrador. They feed in the turbulent currents searching the rocky bottoms for aquatic insects. Similar to other sea ducks, harlequins are long-lived, but slow to reproduce. Harlequins breed at two years or older and lay a single clutch of 6 eggs each spring.

In the fall, the eastern North American harlequins migrate to coastal wintering areas from Newfoundland to Maryland. However, the majority winter in the Gulf of Maine. Maine winters the largest number of harlequin ducks, where they inhabit wave exposed offshore islands and ledges and feed on aquatic invertebrates clinging to the rocks and seaweeds.

Historical evidence suggests that the eastern North American population has declined from as many as 5,000 – 10,000 individuals in the 1800s to fewer than 1000 individuals in the 1980s. Concerned about the dramatic decline of an already low population, the Maine Department of Inland Fisheries and Wildlife led the way and closed the hunting season for harlequins in 1989. The U.S. Fish and Wildlife Service followed Maine’s lead and eventually closed hunting on the entire east coast. The harlequin became listed as Threatened under Maine’s Endangered Species Act in 1997, based on an estimated low winter population of only 500 individuals. At the time, this represented more than 50% of the total estimated eastern North American population. Further, more than 90 % of Maine’s winter population was located at fewer than 5 sites, increasing the risk of extirpation along our coast. Since 1997, Maine’s harlequin numbers have gradually increased to an estimated 1,100 birds.

To monitor the status of Maine’s winter harlequin population, MDIFW conducts annual boat surveys in the core wintering area in outer Penobscot Bay and Jericho Bay in March. To better assess changes in distribution and numbers, MDIFW has determined that combined with the annual mid-coast surveys, a coast wide survey of all harlequin habitats from Kittery to Calais should be conducted every 5 years.

Funded by the Inland and Coastal Surface Oil Spill Clean Up Fund, a coast wide survey was conducted in March, 2008. MDIFW contracted with three coastal researchers to conduct boat surveys and MDIFW staff performed surveys along the mainland. Despite challenging winter weather conditions, the first coast wide survey in over 15 years was completed by the end of March. A total of 1,086 harlequins were recorded (Table 7).

**Table 7. Maximum winter counts of Harlequin Ducks wintering in Maine**

Region	Year							
	2001	2002	2003	2004	2005	2006	2007	2008
Frenchman Bay east to Calais	ns*	ns	ns	ns	ns	ns	ns	331
Jerich Bay	628	633	343	586	574	656	752	384
Isle au Haut	204	210	198	254	173	268	198	114
Vinalhaven and surrounding islands	37	55	26	57	25	98	73	137
Outer Penobscot Bay (Metinic, Matinicus, Monhegan islands)	ns	ns	ns	ns	ns	ns	ns	63
York & Cumberland counties	51	ns	ns	ns	ns	ns	ns	57
<b>Total</b>	<b>920</b>	<b>898</b>	<b>567</b>	<b>897</b>	<b>772</b>	<b>1,022</b>	<b>1,023</b>	<b>1,086</b>

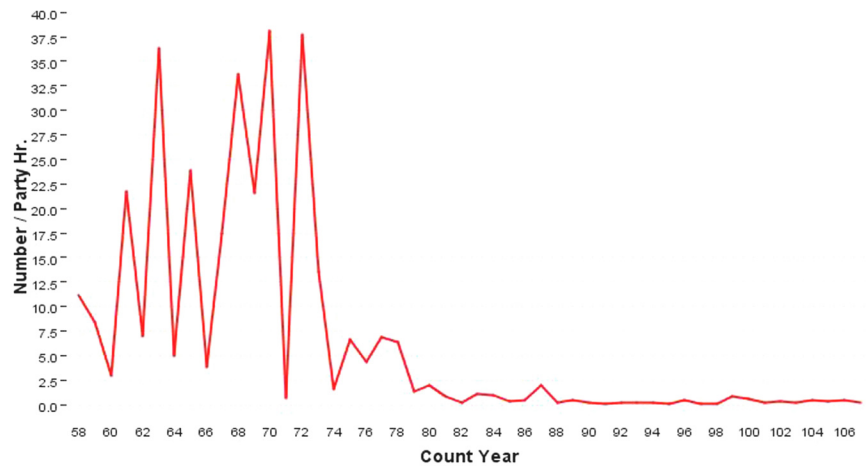
\*not surveyed

Note: survey in 2003 was only a partial survey of those three areas and poor weather conditions in 2005 may have influenced the number of birds sighted that year.

--Lindsay Tudor

## Rusty Blackbirds

The Rusty Blackbird (*Euphagus carolinus*) is a wetland-breeding blackbird of the boreal regions of northern North America. Formerly considered common, it has shown dramatic declines in numbers during the past century, with these declines accelerating since 1970 (Figure 1). The cause of this continent-wide decline is not clear, although experts suggest several anthropogenic factors, including draining and conversion of wetlands in their wintering range, wetland acidification leading to declines of invertebrate prey, and disturbance from landscape changes. However, none of these hypotheses clearly account for both the magnitude and prolonged duration of this decline. During the 2001-2002 Ecoregional Surveys, MDIFW conducted roadside surveys of nearly 200 wetland sites in northwestern Maine. We found breeding rusty blackbirds at only 18 locations, and some of these may have been unpaired males. In late 2005, we began a study that involved a baseline inventory of the current geographic distribution and abundance of rusty blackbirds in Maine. An unexpected outcome of our surveys was our ability to locate rusty blackbird nests. Furthermore, in 2006, we began regular monitoring of nest success and took detailed measurements of vegetation surrounding each nest. In 2007, we expanded this effort to include radiotracking of individual birds to improve our estimates of nest success, and to better understand movements and spatial requirements.



**Figure 1. Trend in the continental Rusty Blackbird population based on Christmas Bird Count data from 1960-2004.**

Overall, we surveyed 550 wetlands in 2006 and 2007; rusty blackbirds were observed in 48 (9%) of these. We estimated detectability (i.e., the probability a rusty blackbird will be observed at a wetland given that wetland is within its home range) at only 19%. An analysis of occupancy revealed a mean of 0.371 (or 37.1%). These data suggest that although we actually encountered the species at only 9% (48) of the sites surveyed, because they are so difficult to detect (e.g., use multiple wetlands, don't sing much, etc.) they actually were present at 204 (37.1%) of the surveyed wetlands during some period of the breeding season. The best available records for Maine suggest that the range of rusty blackbirds in our state has been contracting over the last 100 years. Comparing our data to those of previous surveys, the Maine Breeding Bird Atlas, and reports by early ornithologists, it appears their range contracted most rapidly during the 1980s and 1990s. We believe this species' range boundary has shifted, by our estimates, approximately 160 km to the northwest.

Young, regenerating spruce and fir were typically chosen as nest sites. We found 35 nests and monitored each nest periodically and confirmed that 61.6% of the nests successfully fledged young. Of the nests that failed nearly 75% appeared to have been predated. Nests in regenerating clearcuts adjacent to wetlands had lower success than nests located in natural fen habitats. We believe regenerating stands of thick spruce and fir near wetlands mimic conditions found in boreal forest wetlands where stunted spruce and other woody species provide structurally similar habitat.

Our radio tracking effort was highly successful. We captured and attached radiotransmitters to 15 adult rusty blackbirds in 2007, including 8 individuals at the first "colony" to be reported in New England. Mean home range size was 37.5 ha, yet varied greatly from 3.8 ha to 178.8 ha. The largest home range (178.8 ha) belonged to a male and measured more than twice the size of any other individual and was believed to be unpaired. We found no differences in size of home range between sexes, but colonial birds had larger ranges than non-colonial birds. Most birds included multiple wetlands within in their home ranges, which if individuals spend substantial time in each wetland, could help explain why detectability was so low.

--Thomas Hodgman

## Bald Eagle

In August, 2007 the Bald Eagle was federally "delisted." The species was first recognized as Endangered across the southern tier of states in 1967. This designation was extended to Maine and all but five of the lower 48 states in 1978. After prolonged recovery efforts, the federal status of bald eagles was downgraded to Threatened in 1995. Further progress and achievement of recovery goals in all 5 national recovery plans led to removal of the federal Threatened Species designation in 2007. Approximately 10,000 pairs of bald eagles now reside in the lower 48 states: up from the remnant level of 417 pairs tallied in 1963.



After defining the term “disturb” under the Bald Eagle – Golden Eagle Protection Act, adopting related national management guidelines, and drafting a 20-year monitoring plan, the U.S. Fish and Wildlife Service removed bald eagles from the federal Threatened Species list last year. The desert population in Arizona is being evaluated for eligibility as a “distinct population segment” that might warrant recognition as Threatened. In a few states, the Threatened Species status ended automatically with the recent change in federal law, but most will now evaluate eagle status under state law. Only three (Minnesota, Washington, and Wisconsin) have removed bald eagles from state lists of Threatened Species based on recovery within state jurisdictions, but Maine and four others are considering this change.

In a 2006 nationwide compilation, Maine’s 414 nesting pairs ranked 9<sup>th</sup> highest amongst the lower 48 states. The preliminary count this year is 477 nesting pairs: a preliminary total likely to rise slightly. Maine is the stronghold for eagles in the northeastern U.S. and supports 88% of all eagles in New England + New York. Downeast Maine (Washington, Hancock, and Penobscot County) still supports half of the state’s breeding population. Nesting eagles now reside and are increasing in all 16 counties. Annual increases in Maine’s eagle population have averaged 7% over the last 20 years.

Moreover, bald eagles have now achieved all recovery criteria established in Maine’s 1989 management system. This strategy identified both biological criteria and habitat safeguards since protection of nests has been an integral part of Maine’s recovery effort. Objectives for delisting bald eagles in Maine are:

- ❖ Breeding population exceeds 150 nesting pairs for 3 consecutive years - **achieved: 1996.**
- ❖ Annual eaglet production exceeds 150 fledglings for 3 consecutive years - **achieved: 1999.**
- ❖ No annual population declines of 5% or more for 3 consecutive years - **achieved: 2000.**
- ❖ Federal “delisting” from endangered/threatened status - **achieved: 2007.**
- ❖ Habitat “safety net” to maintain species recovery, including
  - At least 50 nesting areas fully protected by conservation ownership or appropriate easements - **achieved: 2004 and**
  - At least 100 additional areas under conservation ownership, appropriate easements, or cooperative agreements with private landowners – **ongoing, completion anticipated by 2009.**

Maine’s bald eagles have vastly surpassed all biological criteria for delisting. Regardless of population size, many agree that the future availability of suitable habitat is the ultimate challenge for a lasting recovery of bald eagles. Eastern states generally lack the public land base that sustains bald eagle habitats in the West. Conservation organizations in Maine (MDIFW, Maine Bureau of Parks and Lands, U.S. Fish and Wildlife Service, Acadia National Park, The Nature Conservancy, Maine Coast Heritage Trust, Forest Society of Maine, New England Forestry Foundation, and numerous local land trusts) now provide secure habitat for 100 eagle nesting areas and partly protect 215 others across Maine. When recovery efforts began, only 5% of the state’s nesting eagles were secured by conservation interests.

Many private landowners have been steadfast stewards of eagles nesting on or near their property. Many will enroll key parcels in the Landowner Incentive Program to help satisfy this last state delisting criterion. Thus, MDIFW will conduct a public hearing later in 2008 and solicit input on a proposal to remove the Threatened Species classification of bald eagles under state law. That recommendation will be considered by the 124th Maine legislature when it convenes in 2009.

Since 1990, Essential Habitat rules implemented by MDIFW assure that all projects permitted, funded, or carried out by municipalities and state agencies do not significantly alter nest sites designated by rule. This special provision of the Maine Endangered Species Act will no longer apply to bald eagles after state delisting. Thus, efforts to bolster the habitat safety net as insurance for lasting recovery of eagles are critically important. A public working group set 15-year goals and objectives for bald eagles to double the habitat safety net by 2019 and set a benchmark of at least 600 nesting pairs by 2019. Both are clearly attainable even if eagle population growth slows somewhat after delisting. The progress achieved in bald eagle recovery programs is indeed remarkable.

*This work is supported by funds from State Wildlife Grants as well as state revenues from the Loon Conservation Plate and Chickadee Checkoff funds.*

*--Charlie Todd*





## MAMMAL GROUP

The **Mammal Group** is one of 4 groups in the Wildlife Resource Assessment Section (WRAS), in the Bangor Office. We develop and oversee implementation of all management systems for Maine's mammals; address public and Departmental information needs through the development of research programs, monitoring protocols, species assessments, and public presentations; and assist in the formulation of harvest regulations by analyzing biological data, meeting with regional biologists, and making recommendations to the Department's upper administration.

**Wally Jakubas, Mammal Group Leader** – Supervises mammal group personnel, oversees all group activities, coordinates group activities within and outside of the Department, manages the group's budgets, serves as furbearer biologist and Departmental spokesperson on furbearer issues, and serves as lead biologist on wolf and cougar issues.

**Randy Cross, Wildlife Biologist** – Supervises bear field crews, assists in analyzing bear data, oversees the processing and aging of moose, deer, and bear teeth, and assists other biologists in field and office activities.

**Karen Morris, Wildlife Biologist – Retired in spring 2008.** Karen oversaw moose management, data collection, and analysis; coordinated the monitoring of small mammals (e.g., bats, voles, and New England cottontail); and served as Departmental spokesperson on moose issues.

**Lee Kantar, Wildlife Biologist** – Oversees the management of Maine's white-tailed deer population including biological data collection and analysis, review of the deer management system, and sampling for Chronic Wasting Disease. Lee is the Departmental spokesperson on deer issues. After Karen Morris' retirement in spring 2008, Lee was assigned moose management responsibilities for the Department. Lee will continue as the Department's moose and deer specialist and another biologist will be hired to cover small mammals and furbearers.

**Jennifer Vashon, Wildlife Biologist** – Oversees the bear and lynx programs, including bear and lynx management issues and data analysis, and serves as Departmental spokesperson on lynx and bear topics.

**Scott McLellan, Biology Specialist** – Helps coordinate field activities for the lynx research project, including field camp operations, trapping, and chemical immobilization of research animals, and assists the lynx project leader with data analysis.

**2007-08 Contract Workers & Volunteers** – Contract Workers: Patrick Burke -- snowshoe hare surveys, Nick Fortin -- ecoregional surveys, Kendal Marden -- bear and deer Projects, Mark Martin -- moose and ecoregional projects, Dave Pert -- bear and deer Projects, Chris Reynolds -- lynx project, Eric Rudolf -- bear and lynx projects, Alexej Siren -- bear project, Dave Tibbetts -- New England cottontail surveys, Dan Wagner -- bear project. Volunteers: lynx project: Matt Nickols, Kate Williams; bear project: Brandon Coones, Dominic Grenier, Ashley Malinowski, Marcus Mustin.

*We deeply appreciate the dedication and hard work we receive from our contract workers and volunteers!*

## MAMMAL CONSERVATION AND MANAGEMENT

### ***White-tailed Deer***

#### **2007 Season Dates and Structure**

Maine Deer hunters could hunt white-tailed deer for 79 days within the structure of five different hunting seasons during 2007: expanded and special archery, rifle, muzzleloader and Youth Day.

#### **2007 Doe Quotas, Any-Deer Permits, and Applicants**

During 2007, doe quotas ranged from zero in 8 Wildlife Management Districts (WMDs), Districts 1-5, 19, 27 and 28 to 1,295 in WMD 17 (Figure 2). Among the 22 WMDs in which a doe harvest was desired, the adult doe quota totaled 8,488. We issued 64,970 any-deer and 705 bonus any-deer permits (WMDs 20, 22, and 24). In addition, 1,305 Superpack licenses were assigned. All combined, these 66,275 permits represented a 2% decrease in antlerless deer hunting opportunity compared to 67,725 permits in 2006. Permit allocations ranged from zero in the 8 WMDs with a zero doe quota, to 11,000 permits in WMD 17. The top 5 WMDs receiving any-deer permits on a per 100 mi<sup>2</sup> basis were: WMD 22 (1,679 permits per 100 mi<sup>2</sup>), WMD 24 (1,061 permits), WMD 21 (1,122 permits), WMD 20 (1,120 permits), and WMD 17 (1,007 permits). Maine residents drew 48,458 permits (73%), landowners drew 13,255 permits (20%), and nonresidents drew 4,562 any-deer permits (7%). Overall, 80,486 people applied for any-deer permits in 2007 (62,380 residents; 10,574 landowners; 7,532 nonresidents).



## 2007 Statewide Statistics

Overall, 28,884 deer were registered during 2007, of which 1,532, 704, 1,065, 23,537, and 1,964 were taken during the expanded archery, regular archery, youth day (October 22), regular firearms, and muzzleloader seasons, respectively (Table 8). Eighty-two deer were registered without an associated season. In 2007, 1,034 fewer deer were harvested than in 2006, or a 3% decrease (29,918 vs. 28,884 deer). The 2007 harvest is above the average number of deer harvested over the 22 year history of any-deer permit regulations (i.e., 28,704).

### Buck Harvest

The statewide harvest of 16,103 antlered bucks in 2007 was negligibly smaller than last year's harvest (16,149). The top 5 buck-producing (per mi<sup>2</sup> basis) WMDs in 2007 were (in descending order), districts 24, 21, 22, 23, and 17 (excluding 29), all in central and southern Maine. Among the 16,103 antlered bucks taken

in 2007, roughly 7,890 (49%) were 1 ½ year-olds (yearlings) sporting their first set of antlers, while more than 2,093 (13%) were mature bucks (4 ½ to 15 ½ years old). Male fawns are reported with antlerless deer. The high percentage of yearlings in the 2007 statewide harvest may reflect greater than normal overwinter survival from the mild winter of 2006-07. This in turn may cause an under-representation of older aged deer in the harvest.

### Antlerless Deer Harvest

The statewide harvest of adult (older than fawn) does during 2007 was 8,549, or very close to the pre-season quota (~8,488 adult does). During 2007, any-deer and bonus permittees also tagged 3,480 fawns, while archers and youth day hunters tagged 752 young of the year. Overall, 12,781 antlerless deer were registered by hunters during the 2007 season.

### Harvest by Season and Week

In 2007, ~81% of the total deer harvest occurred during the 4-week firearms deer season. Overall, archery was down 10%. Both October-regular archers and expanded archery participants had lower success than in 2006, i.e., 11% and 9% respectively. Typically the muzzleloader harvest comprises a small proportion of the overall harvest (3% of the total deer harvest in 2006); however, in 2007 the muzzleloader harvest comprised 7% of the total harvest, which was an increase of 107%! Contributing to the markedly higher deer harvest by muzzleloaders was good snow tracking conditions, continued growth in the popularity of the sport, and improvements in muzzle loading equipment.

The sixth youth day hunt occurred on Saturday, October 22. Youth hunters capitalized on this either sex hunt by harvesting 1,065 deer; 70% of which were antlerless deer.

### Harvest By Hunter Residency

Residents tagged 90% (26,034 deer) of the total harvest during 2007. Among seasons, the proportion of the harvest registered by Maine residents was highest for youth day and expanded archery (98%), extended muzzleloader (97%), followed by statewide muzzleloader (91%), regular archery (90%), and

**Table 8. Sex and age composition of the 2007 deer harvest in Maine by WMD<sup>1</sup>.**

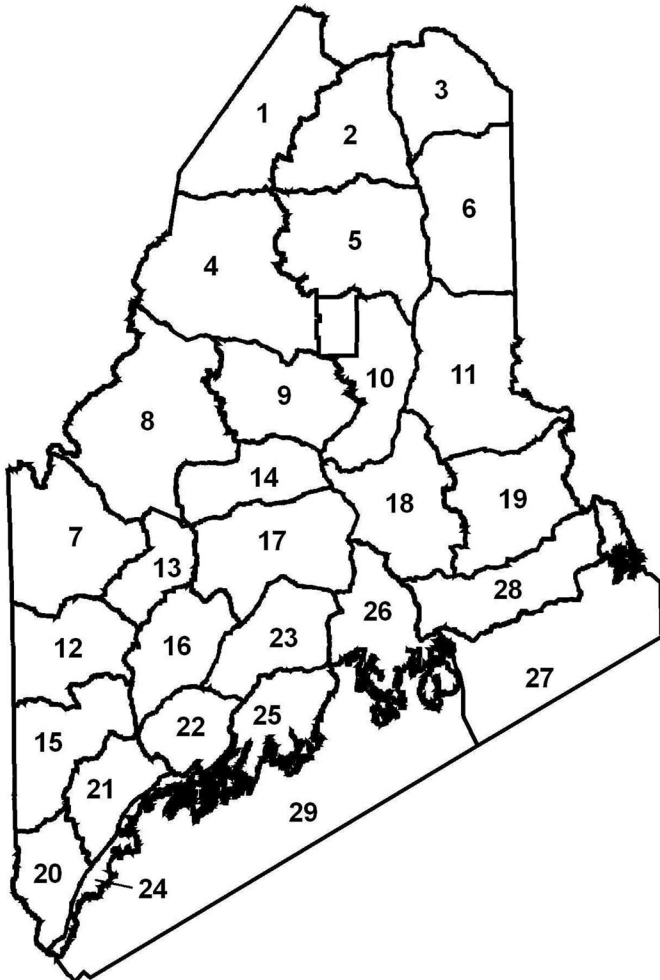
Wildlife Management District	Adult		Fawn		Antlerless Deer	Total All Deer
	Buck	Doe	Buck	Doe		
1	120	9	1	0	10	130
2	103	10	0	1	11	114
3	120	11	3	3	17	137
4	153	13	1	0	14	167
5	230	10	4	6	20	250
6	403	59	19	16	94	497
7	435	104	28	23	155	590
8	371	94	22	26	142	513
9	138	45	8	8	61	199
10	150	25	4	2	31	181
11	553	82	27	25	134	687
12	591	252	78	68	398	989
13	358	224	52	47	323	681
14	369	149	37	39	225	594
15	1,144	861	233	213	1,307	2,451
16	1,067	706	204	198	1,108	2,175
17	2,171	1,349	355	328	2,032	4,203
18	376	120	25	25	170	546
19	174	15	2	4	21	195
20	856	630	140	130	900	1,756
21	977	673	197	205	1,075	2,052
22	840	722	195	179	1,096	1,936
23	1,330	970	225	219	1,414	2,744
24	452	358	91	84	533	985
25	718	342	67	58	467	1,185
26	1,064	426	84	96	606	1,670
27	330	36	10	12	58	388
28	225	16	5	6	27	252
29	285	238	46	48	332	617
Statewide	16,103	8,549	2,163	2,069	12,781	28,884

<sup>1</sup>Sex/age data were corrected for errors in the deer registrations

regular firearms (90%). In 2007, non-residents harvested a lower than normal number of deer. WMD 4 along the Quebec border had the largest share of nonresident hunters in a WMD (41%; primarily Canadians from Quebec). At the other end of the spectrum, 99% of the deer killed in heavily populated WMD 21 (south-coastal Maine) were registered by Maine residents.

#### *Hunter Participation and Success Rate*

During 2007, 204,099 deer hunting licenses were sold in Maine; of these 85% were bought by residents. Hunter density, therefore, averaged about 6 / mi<sup>2</sup>, statewide, and these hunters expended an estimated 1.08 million hunter-days effort pursuing deer over the course of our 79-day hunting seasons.



**Figure 2. Maine's Wildlife Management Districts.**

In its 11th year, the expanded archery season attracted over 10,000 participants (over 90% residents). Still, the sale of special muzzleloading season permits has increased substantially over the last 10 years doubling to 19,551 permits in 2007.

Deer hunting success in Maine during the regular firearms season was estimated at 16% for residents and 10% for non-residents during 2007. The success rate among hunters who drew an any-deer permit (range 18-43%) is typically higher than among hunters who were restricted to "bucks-only" during the regular firearms season (range 7-12%).

#### **Prospects for the 2008 Deer Season**

In 2008, we will offer 5 separate deer hunting seasons in Maine. The expanded archery season will open September 6<sup>th</sup> and run until to December 13<sup>th</sup> (85 days). This season is limited to WMDs 24 and 29 (formerly WMD 30-Islands from Vinalhaven south), as well as 9 other locations, primarily in residential-suburban sprawl areas with firearm discharge ordinances. The regular (statewide) archery season will run from October 2 - October 31 (26 days). Youth day will be Saturday, October 25<sup>th</sup>, and is reserved for hunters between 10 and 15 years old, who are accompanied by a licensed adult (who is not allowed to carry a hunting weapon). The 25-day regular firearms season opens for Maine residents on Saturday, November 1st, and for nonresidents the following Monday. This season ends the Saturday following Thanksgiving (November 29th). Finally, the muzzleloader season will begin in all WMDs on December 1st, but will end on December 6th (6 days) in WMDs 1 – 11, 14, 19, 27 and 28. Elsewhere, the muzzleloader season will continue until December 13th (12 days). Crossbow Archery season will coincide with modern firearms.

To accomplish deer management objectives in 2008, we have set doe harvest quotas ranging from zero to 1,045 among our 29 WMDs. Totalling 6,080 statewide, the 2008 doe quota is 29% below the doe harvest we achieved in 2007. This reduced doe quota from 2007, reflects the tremendous impact the harsh winter of 2008 had on deer populations throughout the state and significant winter mortality. A total of 51,850 any-deer permits will be issued statewide ranging from 600 permits in WMD 29 to 9,925 in WMD 23. WMDs 1-14, 18, 19, 27 and 28 will not have any permits allocated.

The allocation of 51,850 any-deer permits, along with the archery and youth seasons, should result in the statewide harvest of roughly 6,280 does and an additional 3,579 fawns in 2008. Antlered buck harvests should approximate 14,355 about an 11% decrease from the 2007 buck kill of 16,103. The tough winter was particularly hard on fawns, thereby reducing the availability of yearlings in the 2008 harvest. If normal hunting conditions and hunter effort take place, the statewide deer harvest in Maine should be in the vicinity of 24,214 deer. This would be lower than the 20-year average harvest (28,704) since the any-deer permit regulations were put into effect and represents the lowest harvest since 1987.

--Lee Kantar

**FOR MORE INFORMATION ON DEER HARVESTS, SEASONS, ETC.,  
PLEASE VISIT THE DEPARTMENT LINK LISTED BELOW:**  
[http://www.maine.gov/ifw/wildlife/surveys\\_reports/research\\_management/index.htm](http://www.maine.gov/ifw/wildlife/surveys_reports/research_management/index.htm)



## Moose

### 2007 Season Dates and Structure

Maine Moose hunters could hunt moose for 6 days by permit within the structure of a split season framework (September/October) during 2007. The September season ran from September 24<sup>th</sup> to September 29<sup>th</sup>, while the October season ran from the 8<sup>th</sup> through the 13<sup>th</sup>.

### 2007 Moose Permits and Applicants

The annual allocation of moose permits is related to the management goals for each wildlife management district (Figure 2). Antlerless only permits (AOP) and Bull-only permits (BOP) were doubled in WMD 17 to reduce moose densities. Similarly, 10 and 15 AOPs were added to WMDs 3 and 6 to reduce moose numbers, while 5 BOPs were added to WMD 2 and 5 each to increase hunting opportunity. Ten fewer BOPs were issued in WMD 13 due to mature bull numbers being lower than objective (<17%). Therefore the total number of moose permits issued in 2007 was 2,880.



During 2007, AOPs ranged from zero in 7 WMDs (districts 2, 4, 5, 7-9, and 14) to 280 in WMD 6. Among the 19 WMDs in which a cow harvest was desired, the permit allocation totaled 780. The number of AOPs we allocate in a given district is a reflection of that WMDs moose cow quota. Consequently, WMDs that can sustain only limited cow mortality are allocated relatively few antlerless permits. In contrast, WMDs that can support higher cow mortality (and still meet management objectives) are allocated more permits (Road Safety Management WMDs).

Bull-only and AOPs are allocated to qualified applicants in a random computer lottery. Maine residents can purchase additional chances in the lottery as follows: one chance for \$7.00, three chances for \$12.00 and, six chances for \$22, while non-residents can increase their odds as follows \$15.00 = One-chance, \$25.00 = Three-chances, \$35.00 = Six-chances, \$55.00 = Ten-chances. In addition, nonresidents may purchase multiples of 10 chances at \$55.00 each. No more than 10% of the permits for each WMD may go to a non-resident. Upon selection, resident and non-resident permit fees are \$52.00 and \$477.00 respectively. Overall, 65,090 people applied for a moose permit during 2007. This included 46,570 residents and 18,520 non-residents. That equates to 5.6% and 1.5% residents and non-residents selected, respectively.

### Statewide Statistics for 2007

Overall, 2,052 moose were registered during 2007 (Table 9). In 2007, 277 fewer moose were harvested than in 2006 or a 12% decrease (2,329 vs 2,052 moose). The 2007 harvest was below the average number of moose harvested over the last 7 years of moose permit allocations by Wildlife Management District. Since the re-institution of moose hunting in 1980, moose season timing (split season started in 2002) and areas open to hunting has changed several times. The last 4 seasons have remained fairly consistent in number of WMDs open to moose hunting (19) and season framework.

**Table 9. 2007 Moose harvest by sex, age and WMD.**

WMD	Bull	Cow	Bull Calf	Cow Calf	Total Antlerless	Total
1	107	16	1	1	18	125
2	86	0	0	0	0	86
3	168	137	14	6	157	325
4	215	0	1	0	1	216
5	105	0	0	0	0	105
6	186	144	10	6	160	346
7	106	0	0	0	0	106
8	193	0	2	0	2	195
9	48	0	0	0	0	48
10	74	3	0	0	3	77
11	83	45	1	5	51	134
12	25	8	0	0	8	33
13	32	6	0	1	7	39
14	34	1	0	0	1	35
17	11	5	1	0	6	17
18	47	5	3	0	8	55
19	57	6	2	0	8	65
27	12	2	0	0	2	14
28	25	4	1	1	6	31
Total	1,614	382	36	20	438	2,052

### Bull Harvest

The statewide harvest of bulls (1,614) in 2007 decreased 9% from the previous year (1,779). Among the 1,614 antlered bulls taken in 2007, roughly 167 (12%) were 1 ½ year-olds (yearlings) carrying their first set of antlers, while 309 were 2 ½ years old (22% of the bull harvest). Mature bulls (4 ½ to 14 ½ years old) comprised 55% of the 2 ½ and older bull category.

Breeding bulls can lose an average of approximately 15% of their body weight during the rut. Because of this and the timing of the fall harvest, bull weights reflect a decrease in body weight from September to October. Average bull weights in the 2007 harvest for September were 713 pounds versus 660 pounds in the October harvest (>7% decline). The heaviest bull weighted in at 1,086 dressed (no heart, lungs, or liver) and was killed in WMD 4 during the September season. The largest measured spread was 64.6" on a 7 ½ year old bull harvested in WMD 6, and the highest number of points was counted on a 9 ½ year old bull shot in WMD 3 with a total of 30 legal points. Among 1,493 bulls examined in



the harvest, 17% of the bulls sported cervicorn antlers and 47% of these animals were yearlings; 12% were mature bulls (>4 years old) including the oldest at 9.5.

#### ***Antlerless Harvest***

The statewide harvest of adult (older than calf) cows during 2007 was 382 compared to 478 in 2006 or a 20% decrease even with an increase of 40 AOP permits statewide. During 2007, antlerless-only permittees also tagged 56 calves that included 36 males and 20 females. Overall, 438 antlerless moose were registered by hunters during the 2007 season.

#### ***Harvest by Season and Week***

Maine's moose hunting has been split into two seasons, September and October for the last seven years starting in 2002. A hunter is issued a permit for one of the two seasons and can hunt for a maximum of 6 days. This was initially done to reduce and distribute hunter numbers. Permit levels of the two separate moose hunting seasons were 1,133 and 1,747 respectively or (39/61 split).

#### ***Hunter Participation, Residency and Success Rate***

In 2007, 2,597 residents and 283 non-residents won permits to hunt moose. A total of 283 non-residents hunted for moose across all open WMDs with a 100% success rate. Representing 32 states (as far away as California and Oregon) and 1 province (Quebec); the majority (43 or 15%) came up from Massachusetts. Resident success rates were 68% and when combined with the outstanding success by out-of-staters, the total success rate was 71% statewide. Success rates over the last 9 years have been around 79%.

#### **Changes for the 2008 Moose Season**

In 2008, we will offer 3 separate moose hunting periods in Maine; September, October and November. The September season will run from September 22<sup>nd</sup> to September 27<sup>th</sup> in WMDs 1-6, 11 and 19; the October season will run from October 13<sup>th</sup> through the 18<sup>th</sup> and include WMDs 1-14, 17-19, 27, and 28. New for 2008 will be the expansion of the hunt into WMDs 15, 16, 23 and 26. This season will coincide with November's deer season running from November 3<sup>rd</sup> through November 29<sup>th</sup>. Opening day for Mainers will be on Saturday November 1<sup>st</sup>. These 4 additional WMDs were opened up to limited hunting to meet the goal of reducing moose-vehicle collisions in central Maine. A total of 135 permits will be allocated for any moose (bull, cow or calf) in WMDs 15, 16, 23, and 26. The respective distribution in these WMDs will be 25, 20, 45, and 45 permits. 135. In total, Maine's moose hunt will offer a total of 3,015 permits for 2008.

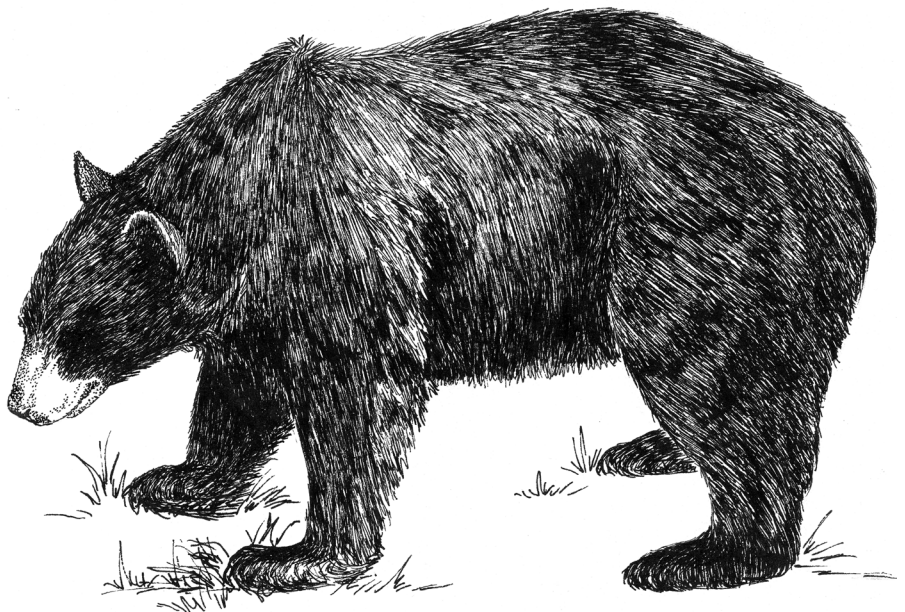
--Lee Kantar

#### ***Black Bear***

Maine has a large population of black bears estimated around 23,000 bears. For more than 30 years, MDIFW has been monitoring black bears in 3 areas of the state to ensure our management of bears is based on current and sound scientific information. This winter was a very exciting year, as we incorporated GPS telemetry monitoring into our research efforts. We equipped a subsample of female black bears on the northern study area with GPS radio collars to improve the quality and quantity of our data. Each GPS collar is programmed to communicate with satellites at fixed times each day to provide thousands of locations/bear at a fraction of the cost of aerial radiotelemetry. This detailed information will allow us to assess importance of different habitat to bears and to update home range and density estimates that are necessary for updating statewide population estimates.

#### **Living with Black Bears**

Each spring, as bears leave their winter dens, the earth too is just awakening from a long winter. The first bear food to emerge in the spring are grasses and plants (e.g., skunk cabbage), followed by emerging buds on trees and shrubs. You may have unknowingly witnessed the use of this traditional spring food as you passed by aspen trees scarred by bears as they climbed to reach the swelling buds. Bears will also return to hardwood ridges to scavenge any remaining nuts on the ground. Since spring foods are less available and generally of lower quality



than summer's berries and fall's nut crops, meat makes up a larger portion of a bear's diet in the spring than any other time of the year. Bears will scavenge carcasses of animals that did not survive the winter or prey on deer fawns or moose calves. As spring wanes into summer and berries begin to ripen, bears are rewarded for the long spell of limited food. Each spring also marks an increase of complaints of bears getting into garbage or taking down bird feeders. These calls usually decline with the onset of berry crops. In Maine, we are fortunate to live among bears. Since many of us choose to live close to the woods, we can take a few steps each year to be good stewards and reduce negative encounters with black bears.

- Bring your bird feeders in and do not resume feeding birds until the fall,
- Keep your garbage secure in a building until the morning of trash pick-up,
- Keep pet and livestock feed in a building or other enclosure,
- Clean your outdoor grill to reduce food odors and if possible store in a building when not in use.

### The 2007 Black Bear Hunting and Trapping Season

The general hunting season for black bear opens the last Monday in August and closes the last Saturday in November. Hunters are allowed to hunt bears near natural food sources or by still-hunting throughout this 3-month period. Hunting bears over bait is permitted for the first 4 weeks and with the use of hounds for a 6-week period that overlaps the last 2 weeks of the bait season. Trappers can harvest a bear in September and October. Despite a long stalking and still-hunting season, most bears in Maine continue to be harvested over bait. A total of 2,871 bears were taken in 2007 (Table 10). Eighty percent of these bears were taken over bait, 12% with hounds, 6% by still-hunting or stalking, and only 2% in traps. More bears were harvested in Aroostook County than any other county accounting for 31% of the harvest. No bears were taken in Knox, Lincoln, Waldo, or Sagadahoc counties, as the bear population is low there and hunting opportunity limited.

Non-resident hunters continue to enjoy hunting bears in Maine with just over half the bear permits sold to non-residents. Most bears (68%) were harvested by a non-resident and most hired a guide. Despite a similar number of Maine resident holding bear permits, Maine residents harvested only 32% of bears and few hired a guide. Non-resident hunters harvested the majority of bears during the bait (71%) and hound season (68%). Despite the low harvest by Maine residents, hunting over bait remains the most popular method for residents accounting for 73% of their harvest. Although few bears are taken during the firearm season for deer or in traps, Maine residents harvested the majority of these.

**Table 10. Number of bears harvested in Maine in 2007 by WMD.**

WMD	Method of Take						Archery	Assisted by Guide	Resident	Nonresident
	Hunting with Bait	While Deer Hunting	Hunting with Dogs	Trapping	Unknown	Total Harvest				
1	126	0	3	0	28	157	9	133	8	149
2	91	0	23	1	2	117	9	109	5	112
3	148	0	27	0	11	186	36	152	43	143
4	234	0	4	0	5	243	26	213	33	210
5	136	0	5	4	3	148	20	131	18	130
6	169	3	11	1	11	195	25	138	59	136
7	93	1	12	4	0	110	14	84	34	76
8	136	1	25	7	3	172	8	123	67	105
9	81	1	2	2	1	87	10	59	30	57
10	134	0	2	1	3	140	11	120	21	119
11	187	2	34	5	5	233	21	163	50	183
12	98	7	35	7	10	157	27	68	90	67
13	15	3	25	3	2	48	3	25	25	23
14	74	2	24	0	1	101	4	70	42	59
15	44	7	15	3	3	72	15	11	53	19
16	1	1	0	0	2	4	1	0	4	0
17	25	4	11	1	7	48	6	6	38	10
18	149	0	22	7	9	187	16	112	83	104
19	115	1	21	1	0	138	16	111	28	110
20	3	0	1	0	2	6	0	1	5	1
21	6	1	0	0	1	8	0	0	8	0
23	0	0	0	0	1	1	1	0	1	0
26	41	5	0	0	4	50	14	4	47	3
27	56	0	8	2	2	68	10	36	31	37
28	139	3	41	7	3	193	13	127	82	111
29	0	1	0	0	0	1	0	0	1	0
<b>State Totals</b>	<b>2,301</b>	<b>43</b>	<b>352</b>	<b>56</b>	<b>119</b>	<b>2,871</b>	<b>315</b>	<b>1,997</b>	<b>906</b>	<b>1,965</b>

Since 2005, hunters harvested approximately 3,000 bears each year, when the previous 4-year harvest averaged 3,700 bears. A variety of factors have likely contributed to the lower harvest rate (weather, natural food availability), but most noticeably was the decline in bear hunters. In 2003, the Department increased bear permit fees (R=\$5.00 to \$25.00 and NR-\$15.00-\$65.00). Bear permit sales dropped, especially among resident hunters (29%), as many non-resident hunters

(19%) had already committed to hunting bears prior to the fee increase. Since non-resident hunters harvest most bears (70%), bear harvest remained above 3,500 bears. In 2004, permit sales remaining high among non-residents (6,500 permits) likely a result of a bear hunting ballot initiative. Beginning in 2005, non-resident bear hunter participation has declined steadily, which corresponded to a decline in bear harvest. However, hunter participation alone did not reduce harvest levels. In 2005, the remnant of hurricane Katrina hit Maine the opening week of the season and abundant natural foods in 2006 contributed to a lower bait season harvest. The lack of late fall foods in 2007 reduced the harvest by deer hunters and trappers, as bears entered dens earlier.

Since 1990, hunters that pursue bears prior to the firearm season for deer are required to purchase a bear permit. While resident deer hunters will continue to enjoy the opportunity to hunt bears without additional permits, trappers and non-resident deer hunters will be required to purchase a bear permit this year. With the support of Maine trappers, this new permit is the first permit that provides a species specific dedicated source of funding, as all fees will be used for research and management of Maine's bears. Although interest in bear trapping has been on the rise (2-5% of the harvest), recent regulatory changes that have limited legal trapping devices has returned trapper harvest rates to previous levels (2%). Thus this new dedicated funding source may be simply symbolic.

*This work is supported by federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), hunting and trapping license revenues, and a grant from Safari Club International.*

--Jennifer Vashon



### **Furbearers and Small Game Mammals**

Furbearers include all mammals harvested primarily for their pelts. In Maine, these include coyote, red and gray fox, bobcat, fisher, marten, raccoon, skunk, short- and long-tailed weasels, mink, otter, beaver, muskrat, and opossum. The pelts of all furbearers, except weasel, raccoon, muskrat, skunk, and opossum are tagged to track the furbearer harvest. Pelt tagging is one of the primary population indices used in our furbearer management systems. Furbearers are primarily trapped but some species (i.e., fox, coyote, bobcat, raccoon, and skunk) are also hunted. Small game that can be hunted includes snowshoe hare, gray squirrel, woodchuck, porcupine, and red squirrel.

### **Overview of Trapping Season**

This year was a tough one for trappers. High gas prices, early heavy snows, and a shorter season on marten and fisher combined to decrease the number of days trappers spent out on their trap lines and the number of furs harvested. Particularly hard hit were trappers targeting beaver and otter. Deep, frequent snows made trapping through the ice difficult, and low otter prices (Table 11) further discouraged trappers. The beaver harvest was the lowest since 1957 and the otter harvest, which usually mirrors the beaver harvest, was the lowest on record (Table 12). Trappers did better with mink. Trappers harvested 1888 animals which was relatively high compared to mink harvests the previous 5 years. Upland trappers were faced with a new challenge of catching marten and fisher within a 4-week season, instead of the usual 9-week season. As luck would have it, even the 4-week season was cut short in many areas when early heavy snows arrived. Consequently, fisher and marten harvests were only about half of their normal levels (Table 12). For fisher, this was probably a good thing since several indices indicated that their population was declining over the last 6 years. Next year, at the request of the Maine Trappers Association, the Department will attempt to moderate the decline in the fisher harvest by going back to a 9-week season, but trappers will be limited to 10 fisher per year. Canid trappers did a little better than fisher and marten trappers. Coyote and red fox harvests were somewhat lower than last year, but the gray fox harvest remained strong (Table 12). Hunters and trappers that pursued bobcat had the most success during the 2007-2008 season. A total of 410 bobcat were harvested by hunters and trappers, making last year's bobcat harvest the highest since 1976.



**Table 11. Average pelt price offered for furs by Maine furbuyers over the last 6 trapping seasons. Prices followed by a superscript (h or L) were significantly higher or lower than the average pelt price the previous 5 years for that species.**

Species	07-08	06-07	05-06	04-05	03-04	02-03
Beaver	\$21 <sup>h</sup>	\$21 <sup>h</sup>	\$18	\$17	\$16	\$14
Coyote	\$21	\$22 <sup>h</sup>	\$17	\$16	\$21	\$20
Red fox	\$20	\$22 <sup>h</sup>	\$17	\$16	\$22	\$24
Fisher (Male)	\$61 <sup>h</sup>	\$71 <sup>h</sup>	\$31	\$27	\$25	\$24
Fisher (Female)	\$63 <sup>h</sup>	\$74 <sup>h</sup>	\$27	\$21	\$21	\$23
Muskrat	\$2.56	\$6 <sup>h</sup>	\$2.60	\$1.69	\$2.15	\$2.64
Raccoon	\$11 <sup>h</sup>	\$11 <sup>h</sup>	\$7.80	\$8.78	\$10.24	\$8.92
Weasel	\$3.67 <sup>h</sup>	\$3.31 <sup>h</sup>	\$2.21	\$1.96	\$2.00	\$1.97
Bobcat	\$60 <sup>h</sup>	\$59 <sup>h</sup>	\$49	\$44	\$50	\$61
Grey fox	\$32 <sup>h</sup>	\$24 <sup>h</sup>	\$17	\$12	\$14	\$10
Pine Marten	\$32	\$45 <sup>h</sup>	\$25	\$21	\$19	\$18
Mink (Male)	\$13	\$22 <sup>h</sup>	\$15	\$12	\$10	\$10
Mink (Female)	\$7	\$13 <sup>h</sup>	\$10	\$8	\$8	\$6
Otter	\$41 <sup>L</sup>	\$45 <sup>L</sup>	\$70	\$68	\$65	\$51
Skunk	\$4.67 <sup>h</sup>	\$5 <sup>h</sup>	\$3.50	\$2.79	\$2.54	\$2.33

**Table 12. Harvest of furbearing animals in Maine. Harvest records are from pelt-tagging records collected from the 2000-2001 to 2007-2008 trapping seasons. Pelt-tagging records may under-represent the harvest of coyote and beaver.**

Species	07-08	06-07	05-06	04-05	03-04	02-03	01-02	00-01
Beaver	6,357	12,635	11,094	10,436	8,222	7,809	11,757	9,803
Bobcat	410	344	344	376	273	331	269	308
Coyote	1,819	2,007	2,077	2,175	2,459	2,287	2,741	1,977
Fisher	993	1,968	1,810	2,174	2,526	2,630	3,117	2,028
Red fox	1,030	1,245	1,067	1,413	1,535	1,469	2,056	1,272
Grey fox	161	107	67	125	196	172	164	89
Marten	2,401	2,350	3,873	2,248	5,088	2,908	5,529	1,832
Mink	1,888	2,280	1,108	1,224	904	935	2,031	1,606
Otter	493	968	1,041	1,113	931	803	1,103	943

*Funds for managing Maine's furbearers primarily come from the sale of hunting and trapping licenses, and from federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), and funds from Loon Conservation Plate funds.*

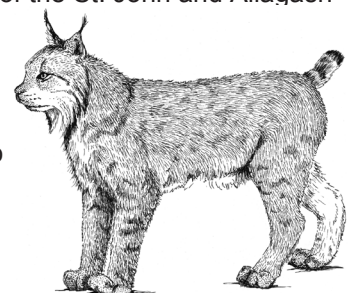
*--Wally Jakubas*

## Canada lynx

The lynx is a medium-sized cat and can be distinguished from a bobcat by its completely black-tipped bobbed tail, long ear tufts, and large paws. Lynx populations are influenced by the numbers and distribution of snowshoe hare their primary prey. In Maine, we are at the southern extent of the lynx range where the forest transitions from spruce-fir to hardwood and winters and snow depths lessen.

## A history of lynx in Maine

It appears that lynx have persisted in low numbers and were most common during the 1800s when up to several hundred lynx were harvested. Periodic surveys of game wardens from the early to mid-1900s reported lynx as common in northern Maine, rare in central and southwestern Maine, and absent along the coast. By 1974, lynx were scarce and rarely found south and west of Moosehead Lake, east of the Penobscot River and the upper headwaters of the St. John and Allagash Rivers. At the time, much of northern Maine was classified as a mature forest. By the late 1970s to mid-1980s, millions of acres of spruce-fir forest were defoliated by the spruce budworm and large tracts of mature spruce-fir forest were clearcut. By the late 1990s much of northern Maine's spruce forest was young and hares were abundant. In 1997, the Department estimated around 200 lynx in the state. More comprehensive studies in early- to mid-2000s indicated that Maine's lynx population was increasing and numbered at least 500. Winter snow track surveys initiated in 2003, indicate that lynx distribution has not changed. Lynx remain most common north of Moosehead Lake and west of Route 11, rare in areas south and west of Moosehead Lake, and absent from the remainder of the state.





## State and Federal Protection

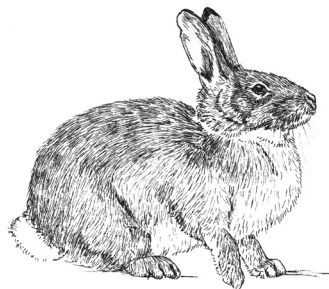
In 1832, a statewide bounty was offered on all wild cats and remained in place until 1967, when Maine's legislature closed the season on lynx. In 1997, lynx were considered for state listing as endangered or threatened, but information on the status of lynx in Maine was insufficient to warrant additional protection. Although not listed, lynx were designated as a species of special concern. This status identifies species that could easily become endangered or threatened and thus warrant special attention. In 2000, the US Fish and Wildlife Service (USFWS) listed lynx as a threatened species in 14 states including Maine. In 2005, the Department reviewed the species on the State's threatened and endangered species list. Although federally listed, lynx did not meet the State's threatened or endangered listing requirements. Information gathered from snowtrack surveys and telemetry studies in northern Maine were critical in making this determination. In 2006, the USFWS did not designate critical habitat for lynx in Maine. Currently, the USFWS is reconsidering this decision. The USFWS is also considering a habitat conservation plan submitted by the Department that would allow a low level of incidental take of lynx by fur trappers. In 2007, the Department placed restrictions on traps in northern Maine to reduce the accidental capture of lynx.

## Department Studies Lynx

In 1999, the Department and the USFWS initiated a radiotelemetry study in northern Maine to determine the status of lynx, and to identify lynx habitat needs and factors that may limit lynx in Maine. Since 1999, we have captured and radiocollared 66 lynx (34 males:32 females) and documented the production of 37 litters of kittens. From 2000-2005, home-range size, productivity, and survival rates of lynx in Maine suggest lynx were thriving in Maine. More recently, snowshoe hare densities and the number of lynx producing litters have declined on the study area. Over the next 2 years, MDIFW, the University of Maine, and USFWS will collect and analyze additional data to determine if lynx can be maintained at lower levels and to identify the conditions (e.g., hare, habitat) needed to maintain lynx in Maine.

*This work is supported by non-game federal funds (Section 6 and State Wildlife Grants), federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), hunting and trapping license revenues, the Maine Outdoor Heritage Fund, Loon Conservation Plate funds, the National Fish and Wildlife Foundation, the National Council for Air and Stream Improvement, the Wildlife Conservation Society, Davis Conservation Foundation, Fuller Foundation, Sweet Water Trust, Wilma K. Wilensky, Lynx System Developers, Defenders of Wildlife, Maine Forest Products Council, and the Cooperative Forest Research Unit.*

--Jennifer Vashon



## New England Cottontail

In 2007, the New England cottontail (NEC) (*Sylvilagus transitionalis*) was added to Maine's endangered species list. The NEC is also considered warranted for federal listing, but at this time, the US Fish and Wildlife Service (USFWS) does not have the resources needed to move forward with the listing. On the ground, the picture of NEC has not improved since listing. Surveys during the winter of 2007-2008 indicated the majority of the 60 sites that had cottontail prior to listing now appear to be abandoned. Fortunately, some new NEC sites were also located. In Maine, a number of governmental agencies and non-profit organizations are working hard to ensure that at least 18 core habitat areas, each greater than 25 acres in size, are set aside for New England cottontail management. In addition, smaller patches of habitat and travel corridors are needed near the management sites.

A consortium of agencies and organizations interested in NEC has undertaken a variety of tasks to recover the species. Our Department, the USFWS, and Environmental Defense are exploring ways to ensure that landowners, who take steps to conserve NEC habitat on their property, retain their ability to use and develop their property. The Natural Resource Conservation Service (NRCS) has made NEC the focus of several of its programs that help landowners defray the cost of managing their property for wildlife (e.g., State Acres For wildlife Enhancement [SAFE], and the Wildlife Habitat Incentives Program [WHIP]). The NRCS also coordinates many of the meetings of the consortium and maintains the action list for the group. The American Forest Foundation explored novel ways to offer incentives to landowners for conserving NEC habitat. The USFWS, in cooperation with other consortium members, has obtained grants to restore and manage areas for NEC. Environmental Defense and MDIFW have taken the lead in preparing informational material for landowners on NEC and their management. Finally, MDIFW and the Maine Department of Transportation are funding research at the University of New Hampshire to determine what landscape features in Maine act as barriers or corridors for NEC. In addition, this study will indicate how the genetic diversity of NEC has been affected by landscape features. As you can see many people are interested in the recovery of NEC, and it is taking many hands to accomplish NEC recovery. However, the most important cooperators will be landowners who are willing to manage for NEC on their property.

*Funds for this work comes from Loon Conservation Plate funds, Outdoor Heritage funds, and the U.S. Fish and Wildlife Service.*

--Wally Jakubas

## REPTILE, AMPHIBIAN, AND INVERTEBRATE GROUP

The Wildlife Division expanded its commitment to the conservation of the full diversity of Maine's wildlife with the creation of a Reptile, Amphibian, and Invertebrate Group in 2005. Maine is home to 18 species of frogs and salamanders (amphibians), 16 species of turtles and snakes (reptiles), and over 16,000 species of terrestrial and freshwater invertebrates, from beetles and butterflies to mayflies and mussels, to name just a few. Coordinating survey, research and conservation priorities for such a diverse suite of organisms is challenging! One of the Group's highest priorities is to address the protection and recovery needs of the large number of reptiles and invertebrates currently on the state's official list of Endangered and Threatened species (21 of 46 species). Some state endangered invertebrates, such as the Katahdin Arctic Butterfly and Roaring Brook Mayfly, are state or regional endemics – found nowhere else in the world but in Maine or a small area of the Northeast.

**Phillip deMaynadier, Wildlife Biologist and Group Leader** – Supervises Group activities and serves as the Department's lead biologist on issues related to the biology and conservation of amphibians, vernal pools, butterflies, and dragonflies.

**Beth Swartz, Wildlife Biologist** – Works closely with the Department's Habitat Group and the Maine Natural Areas Program on Natural Heritage methodologies – a system for tracking state rare and endangered plants and wildlife. Beth also has extensive expertise on aquatic invertebrates with recent efforts devoted to the survey and conservation of Clayton's Copper butterfly, freshwater mussels, and rare mayflies.

**Jonathan Mays, Wildlife Biologist** – Jonathan brings professional experience working with a diversity of reptile, amphibian, and invertebrate species. Currently Jonathan serves as the Department's lead biologist on reptile issues where he coordinates survey and research on several rare turtle and snake species. Jonathan is also coordinating efforts to document the distribution and status of all reptiles, amphibians, spiders, snails, and tiger beetles.

## REPTILE, AMPHIBIAN, AND INVERTEBRATE CONSERVATION AND MANAGEMENT

### ***Amphibians and Reptiles***

#### **Partners in Amphibian and Reptile Conservation**

MDIFW continues to cooperate with an initiative entitled Partners in Amphibian and Reptile Conservation (PARC). Modeled partly after the successful Partners in Flight (PIF) bird conservation program, PARC's mission is to forge partnerships among diverse public and private organizations in an effort to stem recent declines of amphibian and reptile (herptile) populations worldwide. MDIFW participates in northeastern chapter PARC meetings where discussions focus on conservation initiatives for herptiles and habitats of regional conservation concern. To date, PARC-Northeast has made progress on drafting model state regulations, compiling a list of regional species of conservation concern, and publishing management recommendations for habitats of special importance to northeastern herptiles. For more information on herptile conservation efforts, or to join the northeastern working group, visit the PARC website at [www.parcplace.org](http://www.parcplace.org).

*Funding for this work comes from Loon Conservation Plate and Chickadee Check-off funds.*

*--Phillip deMaynadier and Jonathan Mays*

#### **Maine Amphibian and Reptile Atlas Project (MARAP)**

From 1986-1990, MDIFW, in cooperation with Maine Audubon and the University of Maine, conducted the Maine Amphibian and Reptile Atlas Project (MARAP). During a four-year period, over 250 volunteers from around the state contributed approximately 1,200 records of observations of amphibians and reptiles. This initiative culminated in the 1992 publication of the book *The Amphibians and Reptiles of Maine*. The first edition sold out within two years of publication.

By 1998, considerable new data had been compiled and there was increasing demand for updated information on the state's amphibians and reptiles. Editors Malcolm Hunter, Jr., Aram Calhoun, and Mark McCollough revised a second edition, incorporating information from 1,300 new records into updated range maps and species narratives, and added color photographs, and a CD of the calls of the frogs and toads of Maine. Copies of the updated 1999 edition of *Maine Amphibians and Reptiles* can be ordered for \$19.95 from the Information Center, MDIFW (207-287-8000).

MDIFW continues to maintain a comprehensive database on the distribution of Maine's 34 amphibian and reptile species and encourages members of the public to share their observations by completing the MARAP card below (Figure 3).



Please submit observations of any of the four state-listed reptiles – Eastern Box Turtle (Endangered), Blanding’s Turtle (Endangered), Spotted Turtle (Threatened), and Black Racer (Endangered) -- to MDIFW immediately ([jonathan.mays@maine.gov](mailto:jonathan.mays@maine.gov) or call 207-941-4475).

Funding for this work comes from Loon Conservation Plate and Chickadee Check-off funds.

-- Jonathan Mays and Phillip deMaynadier

Maine Amphibian & Reptile Atlas Project (MARAP) Report Card									
SPECIES OBSERVED (describe field marks below): _____	Photo		Handled		Observed		Heard (frogs only)		ID Confidence (%)
	Yes	No	Yes	No	Yes	No	Yes	No	
DATE: _____ / _____ / _____ <small>YEAR MONTH DAY</small>					PRINCIPAL OBSERVER:				
TOWNSHIP: _____					Name _____				
COUNTY: _____					Address _____				
SITENAME: _____					City/State/Zip _____				
DELOME Map Page & Grid (e.g., 02B3): _____					Phone _____				
					Email _____				
					ADDITIONAL OBSERVERS:				
LOCATION (be specific, reference mapped landmarks, when possible include GPS coordinates): _____ _____									
HABITAT DESCRIPTION: _____ _____									
NOTES (Description, # observed, Behavior, Age, Sex): _____ _____ _____									
Return this form and labeled photos to:									
MARAP: Reptile, Amphibian, & Invertebrate Group					jonathan.mays@maine.gov				
Department of Inland Fisheries & Wildlife					or email				
650 State Street, Bangor, ME 04401					or phillip.demaynadier@maine.gov				

Figure 3. Maine Amphibian and Reptile Atlas Project (MARAP) Record Card.

### Amphibian Monitoring

Since 1989, scientists have been concerned that frogs, toads, and salamanders (amphibians) may be declining worldwide. Unfortunately, a recent scientific analysis confirms these suspicions with fully 32% of the world’s amphibian species now considered threatened with extinction, a rate exceeding that for birds or mammals. Maine, like many other states, had little data to assess trends in its own amphibian populations. In 1996, MDIFW and Maine Audubon received an Outdoor Heritage Fund grant to initiate a statewide amphibian-monitoring program, which was launched in 1997. Maine’s Calling Amphibian Survey is part of a nationwide effort organized by the U.S. Geological Survey. Sixty-one road-monitoring routes were randomly established across the state. Each spring and summer season, volunteers drive their individually assigned route three times, recording the diversity and intensity of calling frogs and toads. Several vacant routes still exist, with new volunteers especially needed in northern Maine. Participants are provided training materials to assist them with the identification of each of Maine’s nine species of frogs and toads. With eleven years of data collected (through 2007), we anticipate the ability to analyze preliminary population trends for several species of frogs and toads soon. Currently Leopard Frogs (Special Concern), Pickerel Frogs, and Mink Frogs are among the state’s least commonly reported species. Those interested in participating in this citizen-science initiative should contact Maine Audubon’s Susan Gallo at 207-781-6180 (ext. 216) or visit the website at: [www.maineaudubon.org/conserve/citsci/mamp.shtml](http://www.maineaudubon.org/conserve/citsci/mamp.shtml).

Funding for this work comes from Maine Audubon Society, Loon Conservation Plate, and Chickadee Check-off funds.

--Phillip deMaynadier

### Rare Snakes

Maine is currently home to at least nine species of snake, one of which is state Endangered (Northern Black Racer) and two of which are state Special Concern (Ribbon Snake and Brown Snake). A tenth, the Timber Rattlesnake, was historically native but is now thought to be extirpated from the state. The Maine Amphibian and Reptile Atlas Project (MARAP) continues to provide location records for all snakes, but more detailed research is needed in order to assess movements, habitat requirements, and potential threats to our rare snakes.

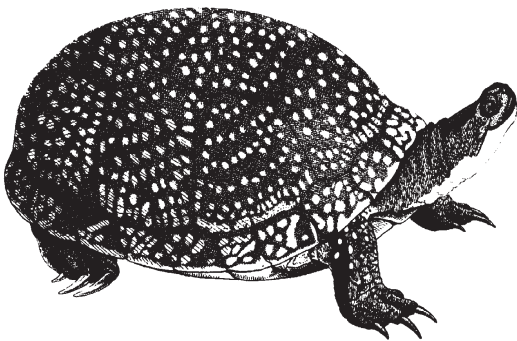
To determine home range size, over-wintering sites, and habitats used, MDIFW is in the second of a two-year radio telemetry project studying Black Racers in southern Maine. Racers are long, slender snakes, jet black in color with a white chin/throat and gray belly. At present, less than 30 sites in Maine are known to have Black Racers and only five of those locations have had racers observed at them within the last five years. To date, nine racers have been implanted with radio transmitters and early analysis has shown that these animals are using very large home ranges in early successional habitat (>50 hectares with one snake using twice that!). Assistance from three dedicated field herpetologists, Jaime Haskins, Trevor Persons, and Mark Ward, along with MDIFW's veterinarian Dr. Russell Danner, has been instrumental in this project. Knowledge gained from this study will assist with the protection and management of Maine's longest and fastest reptile.

Another rare snake project underway is a Ribbon Snake natural history and habitat study being conducted by a graduate student from Antioch College, Leslie Latt, with assistance from MDIFW. Leslie's research hopes to gain more insight into the specific habitats Ribbon Snakes are using and the extent of their movements between aquatic and terrestrial ecosystems.

Historically, snakes have been misunderstood, feared, and even persecuted. Many have stated that snakes are among the least appreciated of Maine's wildlife. While this may be true, snakes fill an important place in the environment and provide balance: preying on small mammals, insects, and other reptiles and amphibians, and providing food for various predatory birds and mammals. Snakes are fascinating creatures and our state is certainly richer with them here.

*Funding for these projects comes from U.S. Fish and Wildlife Service, Maine Department of Transportation, Loon Conservation Plate, and Chickadee Check-off Funds.*

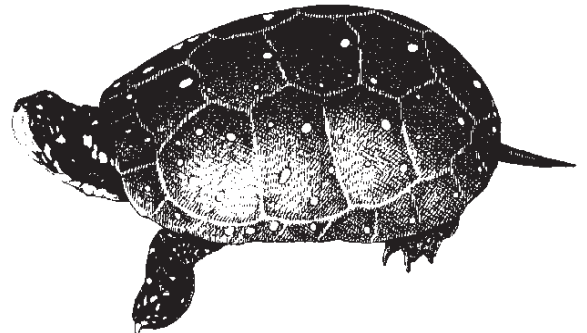
*--Jonathan Mays*



#### **Rare Turtles**

Over the past 17 years, MDIFW has actively researched the distribution and status of Blanding's and Spotted Turtles in Maine. Blanding's Turtles (Endangered) are 7 to 10 inches long with a yellow throat and light colored flecking on a helmet shaped shell. Spotted Turtles (Threatened) are 5 to 6 inches in length, have yellow spots on the head, tail, and legs and a somewhat flat, yellow spotted shell. Both species are semi-aquatic preferring small, shallow wetlands in southern Maine including pocket swamps and vernal pools. Undeveloped fields and upland forests surrounding these wetlands provide habitat for nesting, estivating (a period of summer inactivity), and inter-wetland movements.

Despite the attention these turtles have received, habitat loss and fragmentation continue to threaten both species' viability in Maine. The turtle's shell has provided sufficient protection from predators for millions of years, but unfortunately is no match for a car tire. Both Blanding's and Spotted Turtles are long-lived animals that take a minimum of 7 (Spotted) to 14 (Blanding's) years to reach reproductive age. This coupled with low hatchling success places all the more importance on adult survivorship. Recent population analyses of several freshwater turtle species indicate that as little as 2-3% additive annual mortality of adults is unsustainable, leading ultimately to local population extinction. In other words, losing just a few breeding adult turtles each year to road kill may be the greatest factor threatening the extinction of Blanding's and Spotted Turtles in Maine. To this end, MDIFW and the University of Maine initiated a cooperative research project in 2004 to investigate the extent and significance of road mortality to rare turtles in southern Maine. Frederic Beaudry, after radio-tagging 91 turtles (50 Blanding's and 41 Spotted) over three field seasons, successfully completed his research in southern Maine. Fred's work looked at the nature, extent, and frequency of overland movements of Blanding's and Spotted Turtles, the road mortality risk associated with their movements, and the consequences of this mortality on the population viability of both species. One of the results of Fred's research was the discovery that Blanding's Turtles use on average 6.5 unique wetlands within a single season (one individual male Blanding's Turtle used 20!). MDIFW is currently working with cooperators – including Maine Department of Transportation, The Nature Conservancy, and local towns – to apply results from this research toward designing solutions for areas with a high number of turtle road crossings (e.g., "turtle crossing" signage, barrier fencing, and turtle friendly underpasses). Research in 2008 concentrated on visiting known turtle sites 10 years or more after their first discovery to monitor possible population declines and/or habitat impacts to the wetland. Assistance from dedicated field biologists Dan Hansche and Jaime Haskins made this work possible.





Due to suspected declines throughout the Northeast, a “distinct population segment” of the Blanding’s Turtle may be considered for federal listing by the U.S. Fish and Wildlife Service. Active habitat protection is critical for the preservation of Blanding’s and Spotted Turtles in southern Maine. MDIFW is committed to working with landowners and towns to help conserve remaining large blocks of habitat needed to sustain viable populations of these rare turtles. Southern Maine’s landscape is rapidly developing, and some of the best remaining populations of Blanding’s and Spotted Turtles can be found on a 35,000 acre area surrounding Mt. Agamenticus in York County. MDIFW is working closely with the Mt. Agamenticus Conservation Coalition – including the U.S. Fish and Wildlife Service, The Nature Conservancy, local land trusts, water districts, and towns – to protect habitat for turtles and other rare species in this area, one of the largest remaining contiguous coastal forest ecosystems between Acadia National Park and the New Jersey Pine Barrens. To learn more about progress on habitat conservation in the Mt. Agamenticus area visit: <http://www.nature.org/wherewework/northamerica/states/maine/preserves/art5279.html>.

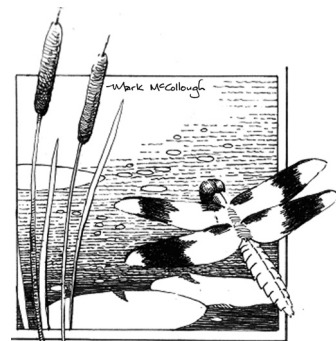
*Funding for this work comes from Loon Conservation Plate, Chickadee Check-off funds, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Maine Department of Transportation, The Nature Conservancy, and the Maine Outdoor Heritage Fund.*

-- Jonathan Mays and Phillip deMaynadier

## **Invertebrates**

### **Rare Dragonflies**

Insects in the order Odonata, damselflies and dragonflies, are a significant and conspicuous component of Maine’s wildlife diversity. Presently, 158 species have been documented in the state, comprising nearly 36% of the total North American fauna. Several of Maine’s odonate species are of national and global conservation concern. Maine currently lists three species as Endangered or Threatened and fully 25 species as Special Concern. While several odonates are highly sensitive to freshwater habitat degradation and experiencing declines nationwide, baseline information for the group had been lacking in Maine, until recently.



In 1998, MDIFW received a grant from the Outdoor Heritage Fund to initiate the Maine Damselfly and Dragonfly Survey (MDDS). MDDS is a multi-year, citizen scientist atlas initiative designed to improve our knowledge of the distribution, status, and habitat relationships of damselflies and dragonflies statewide. In addition to engaging over 200 of Maine’s non-game wildlife constituents and raising public awareness of invertebrate conservation, the MDDS has helped the Department more accurately assess the status of rare, threatened, and endangered odonates. To our knowledge, the MDDS is among the first completely state-sponsored dragonfly atlas projects of its kind in North America and has received considerable notoriety (visit: <http://mdds.umf.maine.edu/~odonata/>). Having recently completed its sixth and final field season, the survey’s results have far exceeded expectations and are best summarized by the following:

#### **1. Public Outreach and Involvement:**

- |  |         |
|--|---------|
| ➤ Volunteer participation statewide:   | >200    |
| ➤ Volunteers trained in MDDS seminars:   | 95      |
| ➤ Newsletter issues published (“Mainensis”):   | 4       |
| ➤ Major press articles covering the MDDS project:  | 5       |
| ➤ Website hits ( <a href="http://mdds.umf.maine.edu/~odonata/">http://mdds.umf.maine.edu/~odonata/</a> ) | >20,000 |

#### **2. Scientific Contributions:**

- |   |               |
|---|---------------|
| ➤ Total records submitted (% increase over 1999 baseline):              | 17,264 (229%) |
| ➤ New Rare, Threatened, and Endangered species records:                 | 297           |
| ➤ New state species records:  | 10            |
| ➤ New U.S. species records (Quebec Emerald & Canada Whiteface):         | 2             |
| ➤ Scientific publications completed or in progress (4 articles/1 book): | 5             |

With the volunteer atlas component of the MDDS project coming to closure, MDIFW has recently contracted Paul M. Brunelle, an accomplished odonate expert and graphic design artist from Nova Scotia, to assist with authoring and designing the project’s capstone product: *An Atlas and Conservation Assessment of Acadia’s Damselfly and Dragonfly Fauna*. Populated largely with data contributed by MDDS volunteers, this atlas will serve as the first authoritative publication on the distribution and natural history of odonates from Maine and the Canadian Maritime Provinces.

*Funding for this work comes from Loon Conservation Plate, Chickadee Check-off funds, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and the Maine Outdoor Heritage Fund.*

--Phillip deMaynadier

## Rare Butterflies

Hessel's Hairstreak, Purple Lesser Fritillary, and Crowberry Blue are just some of the state's rarest butterflies that are both colorful in name and on the wing. In an effort to improve our knowledge of these and other rare butterflies MDIFW is actively studying the group during statewide regional surveys. Attractive, conspicuous, and ecologically important, butterflies have garnered increasing attention from scientists and the general public. By documenting the distribution and status of the state's butterfly fauna MDIFW hopes to improve its understanding of the group and prioritize conservation efforts towards those species most vulnerable to state extinction.



Further supporting this goal, MDIFW received a grant from the Outdoor Heritage Fund in 2002 to contract a professional lepidopterist, Dr. Reginald Webster from New Brunswick, to help assemble a comprehensive assessment of the state's butterfly fauna. Drawing from published literature and specimen records located in museums and amateur collections throughout the Northeast, Reggie assembled the first baseline atlas and database of Maine's butterfly fauna – an essential step toward conservation and management of the group by MDIFW and cooperators. The baseline atlas project compiled nearly 9,000 records and added 11 previously undocumented butterflies to the state list, which now stands at 118 species. Of special note is the relatively high proportion (~20%) of Maine butterflies and skippers that are extirpated (5 species) or state-listed as Endangered, Threatened, or Special Concern (18 species), a pattern consistent with global trends elsewhere for the group. Contact MDIFW to receive an updated checklist of the butterflies of Maine ([phillip.demaynadier@maine.gov](mailto:phillip.demaynadier@maine.gov)) or visit <http://www.state.me.us/ifw/wildlife/wildlife.htm> to download a pdf copy of Maine's first baseline butterfly atlas.

Finally, we are pleased to announce that a statewide volunteer butterfly atlas took flight in 2007. Sponsored by MDIFW, in partnership with the University of Maine at Farmington (Dr. Ron Butler), Colby College (Dr. Herb Wilson), and Dr. Reginald Webster of New Brunswick, the Maine Butterfly Survey (MBS) is a 5-year, statewide, volunteer survey effort. Following in the tradition of previously successful state-sponsored wildlife atlasing projects, including most recently the Maine Damselfly and Dragonfly Survey, data generated from the MBS will come primarily from citizen scientists. The survey will help fill information gaps identified during the baseline assessment (above) on butterfly distribution, flight seasons, and habitat relationships for one of the state's most popular insect groups. Training workshops for new MBS volunteers are currently being scheduled; check the MBS website for further details (<http://mbs.umf.maine.edu>) or contact the volunteer coordinator, Dr. Herb Wilson, at [whwilson@colby.edu](mailto:whwilson@colby.edu) (207-859-5739).

*Funding for this work comes from Loon Conservation Plate, Chickadee Check-off funds, The Nature Conservancy, U.S. Fish and Wildlife Service, and the Maine Outdoor Heritage Fund.*

*--Phillip deMaynadier*

## Clayton's Copper Butterfly

The Clayton's Copper (*Lycaena dorcas claytoni*) is a small, orange-brown butterfly known only from a handful of sites in Maine and western New Brunswick. It is found only in association with its single larval host plant, the Shrubby Cinquefoil. This uncommon shrub has a scattered distribution in Maine and rarely occurs in stands large enough to support viable populations of the butterfly. Where it grows best is along the edges of calcareous wetlands (i.e., rich in calcium carbonate or limestone), which are a rare habitat type in Maine. Not found everywhere its host plant grows, the Clayton's Copper is even more rare – with only nine extant occurrences documented in the state.

This butterfly takes one year to complete its life cycle. In late July and August, when shrubby cinquefoil is blooming, females lay their eggs singly on the underside of cinquefoil leaves. Leaves and eggs drop to the ground in autumn, and the eggs overwinter. The pale green larvae hatch in spring and crawl back up the plant to feed on its leaves. After the larvae molt and pupate in early summer, adult butterflies emerge during July and August to start the cycle over again. Throughout the flight period, Clayton's Copper remains local to its cinquefoil stands, where the abundant yellow flowers provide its primary nectar source.

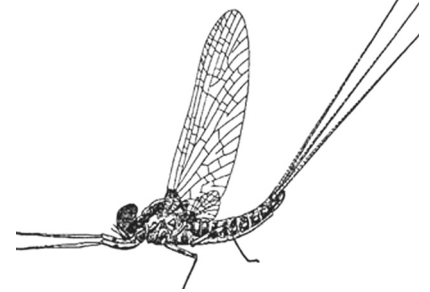
Clayton's Copper is listed as Endangered in Maine because of the extremely limited number, size, and distribution of its populations; the rarity of its habitat, and its near-endemic status. In 2007, MDIFW began a partnership with the University of Maine to investigate two key questions about this rare butterfly. Under the guidance of Dr. Judith Rhymer, UMO graduate student Emily Knurek has begun surveying each of the state's occurrences to estimate the size of Clayton's Copper populations in Maine. Having a baseline population estimate is critical to assessing a species' true status and recovery potential, as well as establishing management goals and monitoring population trends. Emily is also investigating the butterfly's taxonomic status. While most lepidopterists accept that Clayton's Copper is an isolated subspecies of the

more widely distributed Dorcas Copper (*Lycaena dorcas*), the taxonomic distinction between the two has never been quantified. Only detailed morphological and genetic analyses will determine if Clayton's Copper is a true subspecies, thus confirming and further increasing its conservation significance in Maine. Emily's research will continue through 2009.

*Funding for this work comes from the U.S. Fish & Wildlife Service, University of Maine, The Nature Conservancy, American Philosophical Society, Maine Outdoor Heritage Fund, Loon Conservation Plate, and Chickadee Check-off funds.*  
--Beth Swartz

### Rare Mayflies

Two species of mayflies are currently protected by Maine's Endangered Species Act. The Tomah Mayfly, which is listed as Threatened, is a unique insect once thought to be extinct. It was rediscovered in Tomah Stream (Washington Co.) in 1978 and is now known to be extant at about 20 sites in Maine and at least one site in New York. The nymphal stage of the Tomah Mayfly, unlike other species of mayflies, is carnivorous - preying largely upon other mayfly nymphs. This species depends on highly productive, seasonally-flooded, sedge meadows along large streams or rivers to complete its life cycle. Although sedge meadows are not an uncommon habitat type in Maine, the Tomah Mayfly is found at only a small number of sites.



The Roaring Brook Mayfly is listed as Endangered in Maine. First discovered in 1939 on Mt. Katahdin, this species was not reported again until MDIFW went looking for it in 2003. Found in two small tributaries of Roaring Brook, it was originally believed to occur nowhere else in the world but Mt. Katahdin. Recently, however, one specimen was found in a collection from the Green Mountains of Vermont and another from the White Mountains of New Hampshire. Additional surveys by MDIFW in 2007 documented a new site in western Maine on Bigelow Mountain. This rare mayfly appears to be restricted to undisturbed, high-elevation headwater streams along the northern Appalachian Mountain Range, and may be New England's only endemic mayfly.

In addition to these two listed species, thirteen other mayflies are considered Special Concern in Maine. As part of the Department's ongoing surveys for rare species, MDIFW continues to look for new occurrences of these uncommon insects in order to better understand their status and conservation needs.

*Funding for this work comes from the Maine Outdoor Heritage Fund, U.S. Fish and Wildlife Service, Loon Conservation Plate, and Chickadee Check-off funds.*

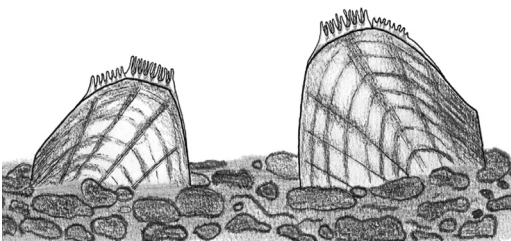
--Beth Swartz

### Freshwater Mussels

Freshwater mussels are relatively sedentary, bottom-dwelling invertebrates found in most of Maine's lakes, ponds, rivers, and streams. Often referred to as a "clam," the freshwater mussel's inconspicuous and seemingly drab lifestyle belies its importance. As filter-feeders, mussels provide a valuable service to aquatic environments by filtering suspended particles such as algae, bacteria and detritus from the water, and by returning nutrients to the ecosystem. In turn, mussels provide food for a variety of wildlife such as muskrats, raccoons, and otters.

Freshwater mussels also have a rather unique and interesting life cycle. They start life as free-floating larvae, called "glochidia", which are quite different in appearance from the adults. The glochidia of most species must encounter and attach to a very specific fish host in order to mature into the more familiar adult form. Once the tiny mussels have dropped off their mobile nurseries (they do no harm to the fish) and burrowed into the substrate, they often remain in the same spot for their entire lives. For some species, a lifetime can span 100 years or more.

Habitat integrity is an important factor influencing mussel survival. Freshwater mussels are sensitive to contaminants and changes in their environment - a vulnerability compounded by specific habitat and fish host requirements, and an inability to leave their surroundings. Consequently, they are one of our most valuable indicators of water quality and aquatic ecosystem health. They are also one of the most imperiled groups of animals in the country. Of the nearly 300 species of freshwater mussels found in the United States, more than a third have already vanished or are in danger of extinction, and over 75% are listed as Endangered, Threatened, or Special Concern at the state level. These dramatic declines have been caused largely by the degradation and loss





of mussel habitat from pollution, dams, and the channelization and sedimentation of our once clean, free-flowing rivers and streams. Poaching of shells for sale to the Orient's pearl culture industry, and the recent invasion of a prolific foreign competitor, the Zebra Mussel, are also jeopardizing many mussel populations.

Maine's freshwater mussel fauna has fared relatively better than that of many states. We haven't lost any species, our freshwater habitats are reasonably clean or have improved in water quality, and the zebra mussel has not yet found its way into our waterways. However, we are not immune to the problems of habitat loss and degradation that have eliminated populations and extirpated species in other parts of the country. Of our ten native species, three (Yellow Lampmussel, Tidewater Mucket, Brook Floater) are currently listed as Threatened under the Maine Endangered Species Act and one (Creeper) is considered of Special Concern. Fortunately, compared to most states within the range of these species, Maine hosts some of the best remaining populations and may be a last stronghold for these rare mussels.

In 2007, MDIFW completed a comprehensive assessment of the state's freshwater mussel fauna. This assessment includes analyses of past, present and future populations and habitat availability for all ten species, as well as research, management and outreach needs. In 2008, a public working group was convened to review the assessment and come up with goals and objectives for managing Maine's mussels. These ongoing efforts will serve as the foundation for development and implementation of a statewide conservation strategy for freshwater mussels.

In 2007-2008, MDIFW also worked closely with several large-scale projects to ensure impacts to rare mussels would be minimized or avoided. Most notable is the Penobscot River Restoration Project, which seeks to remove two hydropower dams on a 5½ mile stretch of the Penobscot where all four listed mussels occur. MDIFW biologists helped the applicants coordinate mussel surveys in the project area in order to plan for future recovery and post-monitoring efforts when the dams eventually come out. The Department also continued to work with applicants planning to remove the Fort Halifax Dam on the Sebasticook River in Winslow, where all three state-threatened mussels occur. Proposals to remove both small and large hydropower dams are becoming increasingly common in Maine, and occasionally impact rare species found in the impoundments or below the dams. When a dam is removed where rare mussels are present, the only conservation tool available to MDIFW is to move stranded mussels to safety. This can be a daunting undertaking on projects like these where extensive areas of substrate, and potentially large numbers of mussels, are exposed as the water recedes. But through cooperation and coordination by everyone involved, a significant portion of the rare mussels affected can be recovered and relocated upstream – from where they may one day help repopulate the newly restored river section below.

More information on Maine's mussels (Figure 4) can be found in *The Freshwater Mussels of Maine* (Neddeau et al. 2000), available through the Department's online store (<http://www.mefishwildlife.com/>) or Information Center (207-287-8000).

*Funding for this work comes from the U.S. Fish and Wildlife Service, Maine Outdoor Heritage Fund, Loon Conservation Plate, and Chickadee Check-off funds.*

--Beth Swartz

Eastern Pearlshell ( <i>Margaritifera margaritifera</i> )	
Eastern Elliptio ( <i>Elliptio complanata</i> )	
Triangle Floater ( <i>Alasmidonta undulata</i> )	
Brook Floater ( <i>Alasmidonta varicosa</i> )	<b>THREATENED</b>
Eastern Floater ( <i>Pyganodon cataracta</i> )	
Alewite Floater ( <i>Anodonta implicata</i> )	
Creeper ( <i>Strophitus undulatus</i> )	<b>SPECIAL CONCERN</b>
Yellow Lampmussel ( <i>Lampsilis cariosa</i> )	<b>THREATENED</b>
Eastern Lampmussel ( <i>Lampsilis radiata radiata</i> )	
Tidewater Mucket ( <i>Leptodea ochracea</i> )	<b>THREATENED</b>

**Figure 4. Freshwater Mussels of Maine**

## ***Special Habitats for Reptiles, Amphibians, and Invertebrates***

### **Pitch Pine Woodlands and Barrens**

Pitch Pine woodlands and barrens are lightly forested upland areas with dry, acidic, often sandy soils. Pitch pine, red pine, scrub oak, blueberry, huckleberry, and/or bluestem grasses are commonly among the sparse vegetation of this unique natural community. It's thought that over half of the state's original pine barren acreage has been lost to residential development, agriculture, and gravel mining. Many dry woodlands and barrens also require periodic fire to prevent succession to a more common, closed canopy white pine-oak system, a natural disturbance that is now short-circuited by habitat fragmentation and fire suppression.

Once viewed as unproductive "wastelands", Maine's few remaining pine woodlands and barrens are now recognized as areas of exceptional wildlife value, providing habitat for a variety of highly specialized plants and animals. Several rare and endangered species persist in one of the State's few remaining intact barren communities, mainly in the towns of Kennebunk, Wells, Waterboro, Shapleigh, Hollis, and Fryeburg. These unique habitats are especially rich in rare lepidoptera (butterflies and moths), hosting species that feed on the specialized barrens vegetation, such as Edwards' Hairstreak (Endangered), Sleepy Duskywing (Threatened), Cobweb Skipper (Special Concern), and Barrens Buck Moth



(Special Concern). Other rare species associated with Maine's barrens include Black Racers (Endangered), Grasshopper Sparrows (Endangered), Upland Sandpipers (Threatened), Short-eared Owls (Threatened), and Northern Blazing Star (a Threatened plant). To learn more about two barrens of statewide ecological significance visit "Focus Area Descriptions" on the Maine Natural Areas Program website ([http://www.mainenaturalareas.org/docs/program\\_activities/land\\_trust\\_descriptions.php](http://www.mainenaturalareas.org/docs/program_activities/land_trust_descriptions.php)), and select "Kennebunk Plains and Wells Barrens" or "Waterboro and Shapleigh Barrens".

*Funding for barrens research and management comes from the Loon Conservation Plate, the Chickadee Check-off, and The Nature Conservancy.*

*--Phillip deMaynadier*

### **Vernal Pools**

Vernal pools are small, forested wetlands that frequently fill with water from early spring snowmelt and rains and then dry partly or completely by mid to late summer. Many of Maine's amphibians use vernal pools as breeding or foraging habitat. Some, like Spotted Salamanders, Blue-spotted Salamanders, and Wood Frogs, breed more successfully in these fishless habitats than in any other wetland type. Additionally, vernal pools provide habitat for a variety of small mammals, wading birds, waterfowl, aquatic invertebrates, and several state-listed animal species including Blanding's Turtles (Endangered), Spotted Turtles (Threatened), Wood Turtles (Special Concern), Ribbon Snakes (Special Concern) and Ringed Boghaunter dragonflies (Threatened).



We still have more to learn about why some vernal pools receive greater wildlife use than others. To this end, grants from the Maine Outdoor Heritage Fund and the U.S. Environmental Protection Agency helped support a recently completed University of Maine study by Dr. Robert Baldwin and Dr. Aram Calhoun to research the wildlife use and characteristics of vernal pools in four southern townships – Falmouth, Biddeford, Kennebunkport, and North Berwick. Rob and Aram's results suggest that wood frogs and other pool-breeding amphibians range widely in the forested landscape following breeding and that surrounding upland forests and forested swamps provide important habitat outside of the brief pool-breeding season. Rob also developed a landscape model that highlights the vulnerability of vernal pools in southern Maine to habitat loss and fragmentation from insufficient conservation lands and wetland regulations.

MDIFW is currently cooperating with the Department's of Environmental Protection and Conservation, Maine Audubon Society, and the University of Maine to identify potential strategies for protecting the unique values provided by smaller wetlands that "fall through the cracks" of current wetland regulations. Workshops on vernal pools continue to be held throughout the state for landowners and land managers, and several new publications designed to offer voluntary techniques for protecting vernal pools and their wildlife are now available. A *vernal pool fact sheet*, describing threats and management considerations, is available upon request from MDIFW for use by landowners, municipalities, land trusts, and other cooperators. The *Maine Citizen's Guide to Locating and Documenting Vernal Pools* provides a comprehensive introduction to recognizing and monitoring vernal pools, including color photographs of the indicator species. Also available to the public are two complementary guide-books for protecting vernal pool habitat during timber management (*Forestry Habitat Management Guidelines for Vernal Pool Wildlife*) and development (*Conserving Pool-breeding Amphibians in Residential and Commercial Developments in the Northeastern United States*). Together, these publications provide recommendations designed to help maintain functioning vernal pool landscapes throughout Maine. All of the guides can be obtained by contacting Becca Wilson at Maine Audubon Society (207-781-6180 ext. 222; [bwilson@maineaudubon.org](mailto:bwilson@maineaudubon.org)).

Finally, the Department's of Inland Fisheries and Wildlife and Environmental Protection recently developed a definition of *Significant Vernal Pools*, a new Significant Wildlife Habitat under the state's Natural Resource Protection Act, recently approved by the state legislature. Criteria for designating Significant pools include a) the presence of a state Endangered or Threatened species, or b) evidence of exceptional breeding abundance by amphibian indicator species. Recognizing a subset of vernal pools as Significant will help state biologists provide guidance on development activities within a critical upland buffer zone surrounding one of the state's highest value wildlife habitats.

*Funding for MDIFW's efforts at research and protection of vernal pools comes from the Loon Conservation Plate, the Chickadee Check-off, the U.S. Environmental Protection Agency, and the Maine Outdoor Heritage Fund.*

*--Phillip deMaynadier*

# MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

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Greenville -- 695-3756

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Sidney -- 547-5300

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Jonesboro -- 434-5927

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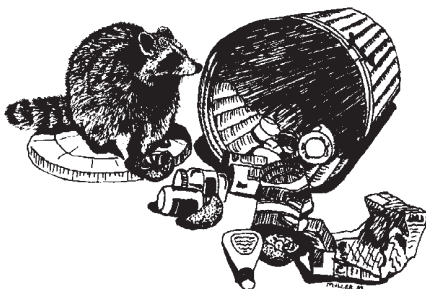
If you cannot locate a Warden at the above numbers,  
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